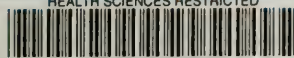


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TWENTIETH ANNUAL REPORT

OF THE

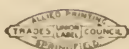
STATE BOARD OF HEALTH

OF THE

STATE OF OHIO

FOR THE

YEAR ENDING DECEMBER 31, 1905



Springfield, Ohio:
The Springfield Publishing Company,
State Printers,
1906.

LETTER OF TRANSMITTAL.

OHIO STATE BOARD OF HEALTH
OFFICE OF THE SECRETARY

COLUMBUS, June 26th, 1906.

To His Excellency, Andrew L. Harris, Governor of Ohio:

SIR:—In accordance with Section 8 of an "Act to create and establish a State Board of Health," as amended May 7th, 1902, the accompanying report, which is for the calendar year 1905, is herewith submitted.

Respectfully,

C. O. PROBST, M. D.,

Secretary.

MEMBERS OF THE OHIO STATE BOARD OF HEALTH.

*FRANK WARNER, M. D., *President*, Columbus.....December, 1905
W. C. CHAPMAN, M. D., *Vice-President*, Toledo.....December, 1906
JOSIAH HARTZELL, Ph. D., Canton.....December, 1907
DARWIN G. PALMER, M. D., Geneva.....December, 1908
BYRON STANTON, M. D., Cincinnati.....December, 1909
J. C. CROSSLAND, M. D., Zanesville.....December, 1910
WM. T. MILLER, M. D., Cleveland.....December, 1911
C. O. PROBST, M. D., *Secretary*.

* Dr. Frank Warner was reappointed.

GENERAL REPORT.

This is the twentieth annual report of the State Board of Health and is for the year ending December 31, 1905.

PERSONNEL OF THE BOARD.

There has been no change in the personnel of the Board since the last report. The term of office of Dr. Frank Warner, of Columbus, having expired December 13, 1905, he was reappointed by Governor Herrick, for a term of seven years.

MEETINGS.

Four regular meetings and one special meeting of the Board were held during the year, the proceedings of which are printed further on.

Following the custom of former years the various local boards of health were invited to meet with the State Board for conference, this being the fifteenth annual meeting of the kind. The papers and discussions were printed in the *Ohio Sanitary Bulletin* and widely distributed.

SMALLPOX.

As predicted in the last report, the epidemic of smallpox practically came to an end in 1905.

The phenomenally mild character of this most interesting epidemic of smallpox was maintained to the last. The disease has been widely prevalent in the United States and Canada since about the year 1897, but has now mostly disappeared.

Beginning in Ohio in 1898 there have been reported to the Board since that time to the close of 1905, 29,457 cases and 890 deaths, giving a death rate for the whole epidemic of 3.02 per cent.

This very low death rate was, as a matter of fact, considerably lower, for while nearly all the deaths were reported, a large number of cases, on account of their very mild character, undoubtedly escaped notification.

Following is a table showing the counties and places invaded by smallpox, and the number of cases and deaths reported during the year ending December 31, 1905:

CASES AND DEATHS OF SMALLPOX REPORTED TO THE STATE BOARD
OF HEALTH FROM JANUARY 1, TO DECEMBER 31, 1905.

COUNTY.	PLACE.	CASES.	DEATHS.
Adams	Meigs Township.....	5	.....
Allen	Bath Township.....	21	.....
	German Township.....	17	.....
	Lima.....	280	.....
	Monroe Township.....	1	.....
	Shawnee Township.....	2	.....
	Spencer Township.....	12	.....
	Spencerville.....	11	.....
Ashtabula.....	Conneaut Township.....	1	.....
Ashland	Ashland.....	6	.....
	Orange Township.....	46	.....
Auglaize	Goshen Township.....	1	.....
Belmont	Bridgeport.....	1	.....
	Flushing Township.....	2	.....
	Martins Ferry.....	1	.....
Brown.....	Ripley.....	2	.....
	Union Township.....	1	.....
Butler.....	Middletown.....	23	.....
Carroll.....	Union Township.....	1	.....
Clark.....	Bethel Township.....	7	.....
	Green Township.....	2	.....
	Springfield.....	5	.....
	Springfield Township.....	4	.....
Clermont	Williamsburg.....	1	.....
Coshocton.....	Franklin Township.....	1	1
Cuyahoga.....	Lakewood.....	1	.....
Darke.....	Greenville.....	16	3
Fairfield.....	Clearcreek Township.....	10	.....
	Hocking Township.....	1	.....
	Lancaster.....	8	.....
Fayette.....	Green Township.....	8	.....
Franklin.....	Columbus.....	8	2
Fulton.....	Fayette.....	8	.....
	Franklin Township.....	1	.....
	Swanton.....	4	.....
Gallia	Huntington Township.....	1	.....
Green	Spring Valley Township.....	9	.....
Guernsey	Jackson Township.....	75	.....
Hamilton.....	Cincinnati.....	194	2
	Cleves.....	1	.....
	Crosby Township.....	5	.....
	Norwood.....	3	.....
	Oakley.....	1	.....
	St. Bernard.....	1	.....
	Springfield Township.....	5	.....
	Symmes Township.....	1	.....
Hancock.....	Arlington.....	1	.....
	Liberty Township.....	1	.....
	Orange Township.....	15	.....

COUNTY.	PLACE.	CASES.	DEATHS.
Hardin.....	Buck Township.....	7	.....
	Cessna Township.....	4	.....
	Dudley Township.....	6	.....
	Kenton.....	39	.....
	McDonald Township.....	12	.....
	Pleasant Township.....	12	.....
Henry.....	Taylor Creek Township.....	7	.....
	Bartlow Township.....	7	.....
	Deshler.....	1	.....
	Hamler.....	11	.....
	Napoleon.....	1	.....
Highland.....	Richfield Township.....	1	.....
	Greenfield.....	5	.....
Hocking.....	Salt Creek Township.....	2	.....
Huron.....	Chicago Junction.....	1	.....
	Clarksfield Township.....	4	.....
	New London.....	40	.....
	New London Township.....	13	.....
Jefferson.....	Dillonvale.....	23	.....
	Mount Pleasant Township.....	1	.....
Lawrence.....	Aid Township.....	4	.....
Logan.....	Belle Center.....	34	1
	Bellefontaine.....	3	.....
	Bokes Creek Township.....	12	.....
	McArthur Township.....	2	.....
	Richland Township.....	4	.....
Lorain.....	Rushcreek Township.....	2	.....
	Rochester Township.....	1	.....
Lucas.....	Jerusalem Township.....	8	1
	Oregon Township.....	1	.....
	Spencer Township.....	1	.....
	Swanton Township.....	1	.....
	Toledo.....	97	.....
	Washington Township.....	15	.....
Madison.....	Waterville.....	4	.....
	Deer Creek Township.....	1	.....
Mahoning.....	Boardman Township.....	1	.....
	Poland Township.....	1	.....
	Youngstown.....	3	.....
Marion.....	Big Island Township.....	8	.....
	Marion.....	14	.....
	Marion Township.....	8	.....
Mercer.....	Black Creek Township.....	2	2
	Celina.....	20	.....
	Dublin Township.....	2	.....
	Hopewell Township.....	9	.....
Montgomery.....	Dayton.....	2	.....
	Miami Township.....	1	.....
Morrow.....	Congress Township.....	3	.....
	North Bloomfield Township.....	4	.....
Muskingum.....	Zanesville.....	1	.....

COUNTY.	PLACE.	CASES.	DEATHS.
Noble	Carlisle	2	.....
	Elk Township	1	.....
	Enoch Township	7	.....
	Noble Township	6	.....
	Olive Township	5	.....
	Sarahsville	15	.....
Ottawa	Stock Township	6	.....
	Bay Township	1	.....
Paulding	Benton Township	1	.....
	Blue Creek Township	8	.....
	Broughton	5	.....
	Crane Township	3	.....
	Haviland	2	.....
	Jackson Township	8	.....
	Latty	16	.....
	Latty Township	6	.....
	Paulding Township	6	.....
Perry	Payne	4	.....
	Bearfield Township	4	.....
Pickaway	Circleville	25	.....
	Jackson Township	1	.....
	Wayne Township	2	.....
Putnam	Glandorf	31	.....
	Ottawa Township	3	.....
Richland	Mansfield	1	.....
Ross	Chillicothe	2	.....
	Colerain Township	7	.....
	Green Township	2	.....
	Huntington Township	19	.....
	Scioto Township	6	.....
	Twin Township	12	.....
	Union Township	4	.....
Sandusky	Washington Township	2	.....
Scioto	Porter Township	1	.....
	Portsmouth	5	.....
Seneca	Tiffin	6	.....
Shelby	Van Buren Township	2	.....
Stark	Canton	1	.....
	Canton Township	1	.....
	Jackson Township	4	.....
	Plain Township	1	.....
Summit	Akron	3	.....
Trumbull	Lordstown Township	2	.....
Union	Leesburg Township	1	.....
Van Wert	Van Wert	3	.....
Warren	Lebanon	2	.....
Williams	Stryker	1	.....
Total, 59 Counties, 147 Places		1,554	12

WATER SUPPLIES AND SEWERAGE.

The importance of the Board's work in looking after matters relating to public water supplies and systems of sewerage is becoming more and more evident. A healthy public sentiment has been created in favor of pure water and purer streams. When water purification works now under way are completed, and others, plans for which have been approved by the State Board of Health, are installed, Ohio will have a larger per cent. of its urban population using filtered water than any other state in the Union.

It is believed that the time has arrived for still more stringent measures on the part of the State in protecting its waters. Municipalities and private corporations cannot be trusted to spare them from pollution without some coercion. The protest has usually come from the private individual in the shape of a law suit against stream corruption; and this is often ineffectual or attended with costly, irritating delays.

No one should be permitted to make use of any stream or lake for getting rid of foul, putrescible substances in any considerable quantity without the consent of the State. If it is good law it would certainly be wise public policy for the State to proclaim its ownership in all streams and natural bodies of water within its borders in so far as protecting them against pollution is concerned. The proper agent of the State to care for these waters and guard them against pollution is the State Board of Health.

It is hoped that the representatives of the people in the present General Assembly will take cognizance of this matter, which has been discussed from time to time in the annual reports of this Board.

In the last report mention was made of an arrangement that had been entered into with the United States Geological Survey to conjointly study the effect of trade refuse in the contamination of streams, and methods for properly caring for such substances. This work has progressed satisfactorily, and some results have been obtained.

Attention was first given to the refuse of a distillery at Lynchburg, Highland County. For years, at intervals, complaints were made to the Board of the pollution of a small stream by the refuse from this distillery. A preliminary examination showed the possibility of converting this waste into food for cattle and removing the source of the stream pollution. The owners of the distillery entered heartily into co-operation. An experimental plant was established, and finally large evaporators were installed at a cost of some \$30,000. The plant has been operated some months, and it appears reasonably certain that eventually a profit of about \$65.00 per day may be counted upon, and the nuisance be entirely abated.

Another similar piece of work of interest was at the Shelby Tube Works. There is an acid waste liquor produced here which gets into the city's sewers, is carried to the sewage purification works, and thence to a small stream.

This waste greatly discolored the stream, largely destroyed animal and plant life therein, and furthermore greatly hindered the working of the sewage disposal plant. Several law suits had been brought on account of the pollution of this stream.

A plan was evolved for removing about 22 per cent. of the acid from the waste and converting it into crystal copperas, at considerable profit. The nuisance has also been much decreased.

The plant cost about \$1,600, and the profits are about \$3.75 a day, or about 80 per cent. upon the investment.

There are many places in the State where similar conditions prevail and where this saving process may be easily and profitably introduced.

The Board acted upon plans presented by the following places:

For a New Water Supply. Arcanum, Delta, Fredericktown, Loveland, Miamisburg, Perrysburg, Prairie Depot (Freeport) and Struthers.

For an Additional Supply. The Institution for the Deaf and Dumb at Columbus, Fostoria and Lynchburg.

For Water Purification. Bellaire, Bucyrus, Cincinnati, Columbus, Fostoria, Lorain, Newark, Shelby and Toledo.

For Sewerage. Capital University at Columbus, Delta, Chicago, Deshler, Elyria (changes,) Elmwood Place, Huron, Jefferson County Infirmary near Steubenville, Leetonia, Monroeville, North Amherst, Norwalk, Norwood, Paulding, Steubenville, Ravenna, Toledo, Urbana and Wauseon.

For Sewage Purification. The Cleveland Tuberculosis Hospital at Warrensville, Columbus, Chicago, Delta, Leetonia and Ravenna.

RURAL SANITATION.

About half of our people live in rural districts. Sanitary problems are comparatively simple there, but nevertheless need constant looking after. There are no public water supplies to be guarded against pollution, but the farm well, from improper surroundings, is often the cause of sickness. There is no sewage to be disposed of, but the barn yard, the hog pen, the chicken coop and the outhouse frequently make trouble.

Contagious diseases do not spread quite so quickly in the country, but communication at school, church, etc., is sufficiently frequent to require prompt and efficient suppressive measures.

Up to the year 1893 there was no provision for health authorities for the rural districts. The township trustees were given power to enforce quarantine measures in cases of smallpox, and that was all. Upon the recommendation of the State Board of Health the Legislature in 1893

enacted a law giving to township trustees all the powers and duties already given to municipal boards of health, and they were authorized to appoint a township health officer.

In many townships this brought about a very great improvement in sanitary conditions, but in the majority very little was done.

In 1902 the Legislature, again acting upon the advice of the State Board of Health, made it mandatory upon township boards of health to appoint a health officer. A considerable number of the townships have failed to comply with this law.

It must be admitted that the township board of health, in a considerable number of townships, has been practically a failure. The reasons are not hard to find.

In the first place the township trustee, as a rule, has little opportunity to learn anything about sanitary matters, and his term of office is comparatively short. He is elected for an entirely different purpose, and does not always relish having this additional and often disagreeable duty thrust upon him. He is apt to have a very inadequate idea of the importance of sanitary regulations, and when willing to appoint a health officer to look after such matters, votes him a salary so small that he does not feel obliged to take any active interest in his position.

VILLAGE HEALTH BOARDS.

The sanitary conditions in many of the small villages are no better than in the townships; are much worse, in fact, than in some of the townships. It was the hope that there would be a very material improvement in the administration of health laws in villages by authorizing council to appoint a health officer in lieu of a board of health, under an act passed in 1902. The trouble had apparently been in getting suitable men to accept appointment on the board of health and in getting the members to meet as often as required.

Of the 675 villages in the State, 321 now have a health officer appointed in lieu of a board of health.

This plan of having a health officer in villages in place of a board of health of five members is undoubtedly a good one, but has not brought about that improvement in sanitary conditions in small places that was expected of it. The reason, in large part, is the small importance attached to the office, as shown by the compensation allowed the health officer by council. Fifteen to twenty dollars a year is about the average salary for the village health officer, and the people in most places are in fact getting more than they are paying for.

COUNTY HEALTH OFFICERS.

The State Board of Health is at a disadvantage in having to deal with local sanitary matters at too long range. It should have some representative in each county to secure the enforcement of necessary health measures. A county health officer would probably best answer this purpose.

To be effective he should be selected solely for fitness, should be entirely independent of political parties, and should be properly paid for his services. He should have general control of all sanitary matters in his county, with possibly only advisory powers in cities, and should be directly responsible to the State Board of Health. He should have charge of the collection and registration of vital statistics for his county, and maintain complete and accurate records thereof at the county seat.

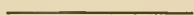
With a county health officer the township trustees might well be relieved of all health duties, except the appointment of a township health officer. This officer might be recommended by the county health officer and approved by the State Board of Health.

The success of this plan will depend upon providing something like adequate compensation for those who are to do the work. Experience has shown that as a rule township trustees and village councils fix the salaries of their health officer so low that in most instances the duties of the office are greatly neglected. It would be necessary for the Legislature to provide in any such plan for a minimum salary for the township health officer; and it would be well if this were also done for the county and village health officer. This might be fixed upon the basis of population and area of territorial jurisdiction.

Believing that the creation of county health officers, if provision is made that suitable men must be selected, would greatly improve sanitary conditions in rural communities, we respectfully recommend and urge that such a plan be provided for by legislative enactment.

The various investigations of the Board, including the work done in the laboratory, will be found under appropriate headings.

MINUTES OF BOARD MEETINGS



SECRETARY'S QUARTERLY REPORTS

JANUARY MEETING.

A regular meeting of the State Board of Health was held at the office of the secretary January 26, 1905, at 8 p. m.

There were present Drs. Stanton, Chapman, Warner, Palmer and Crossland.

On motion of Dr. Chapman it was voted to postpone the reading of the minutes and to hear from a delegation from Columbus in regard to the approval of plans for water filters.

Mr. Julian Griggs, the city engineer, presented an application for approval of such plans, and Mr. J. H. Gregory, the designing engineer, presented the plans referred to.

On motion of Dr. Chapman, it was voted to refer the question of approval to executive session.

Mr. F. I. Consaul, the city engineer of Toledo, speaking for a committee present, presented plans for a water filtration plant for that city.

This matter was also referred to executive session.

The secretary presented a report by the engineer, of an investigation of the water supply of Bucyrus. Mr. Henry Diedrich, the superintendent, and Mr. H. B. Smith, the treasurer, of the Bucyrus Development Company, addressed the Board in regard to the character of the water furnished to consumers.

Consideration of this matter was postponed to executive session.

The Board then went into executive session.

The minutes of the last meeting were read and, on motion of Dr. Stanton, approved.

The secretary presented his quarterly report which, on motion of Dr. Palmer was approved and ordered filed for publication.

The secretary presented a communication from Mr. M. O. Leighton, Chief of the Division of Hydro-Economics of the United States Geological Survey. Mr. Leighton proposed to enter into an agreement to study conjointly with the Ohio State Board of Health, the waters of the State with special reference to the disposal of industrial wastes and the purification of sewage; the general government to appropriate a sum of money equal to that appropriated by the Board for the purpose; the agreement to be entered into between the director of the Geological Survey, for and on behalf of the honorable, the Secretary of the Interior, and the president and secretary of the Ohio State Board of Health, for and on behalf of said Board.

It was moved by Dr. Chapman and seconded by Dr. Stanton, that the proposition be accepted and that the president and secretary be authorized to enter into such agreement.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

The secretary presented a letter from the president of the Tobacco Growers and Farmers' Union in reference to the sale of tobacco sweepings.

The secretary was instructed to consult the Attorney General as to the powers of the Board in dealing with such a case.

The plans for filtration works for Columbus were then taken up for consideration.

On motion of Dr. Chapman, seconded by Dr. Stanton, it was voted to refer the plans to a committee consisting of the president, the secretary and the engineer for investigation and report.

The Toledo plans were taken up, and on motion of Dr. Stanton, seconded by Dr. Palmer, it was voted to refer these plans to a committee consisting of Dr. Chapman, the secretary and the engineer for investigation and report.

The report of the engineer upon the condition of the public water supply of Bucyrus was taken up for consideration.

It was moved by Dr. Stanton and seconded by Dr. Crossland that the Bucyrus Development Company be required to put in a water purification plant, of a design satisfactory to the State Board of Health, within six months from February 1, 1905.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

Matters previously acted upon by mail were taken up for a *viva voce* vote as follows:

It was moved by Dr. Stanton and seconded by Dr. Palmer to confirm the action of the Board approving the plans, presented by Mr. O. E. Pfouts, city engineer of Alliance, for the use of water from well No. 1, located near the corner of Gaskill Street and Walnut Avenue, near the present waterworks pumping station, as an additional or new water supply, provided a sewer be constructed to convey the effluent from the city sewage disposal works to a point below the Gaskill Street bridge; and calling attention to the fact that the water from this well, though not dangerous to health, would probably cause much dissatisfaction on account of its turbidity, hardness and iron contents.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Stanton to confirm the action of the Board approving plans for a public water supply for the village of Franklin, presented by Mr. John B. Miller, health officer, to be obtained from wells located on what is known as the Barklow lot,

situated in the extreme westerly part of the corporation and immediately north of the Cincinnati Northern Railroad, provided that the entire area of about nine acres be controlled by the village and that in the future no wells be located within 200 feet of the southerly, westerly or northerly boundaries of said lot.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Chapman to confirm the action of the Board approving the plans of W. S. Shields, consulting engineer, for sewage disposal for the Ohio Quarries Company at North Amherst, provided that sand filters, satisfactory to the State Board of Health, be added if deemed necessary by said Board, after the plant had been put in use.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Chapman to confirm the action of the Board approving the plans, presented by F. M. Lillie, city engineer of Youngstown, for a sewer in McGuffey Street with outlet into Crab Creek, provided the city of Youngstown, by corporate action, agreed to build a satisfactory intercepting sewer for the Crab Creek district whenever in the opinion of the State Board of Health such action becomes necessary, (This agreement was received.)

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the action of the Board approving the plans, presented by David H. Eells, health officer of Lisbon, for an additional water supply for that village, to be obtained from wells 115 feet deep, located near the present pumping station and near the bank of Beaver Creek.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Chapman, to confirm the action of the Board approving plans, presented by Dr. John R. Pipes, health officer of Avon, for a sewer, ten inches or more in diameter, to discharge at the foot of the main street in Beach Park, Avon Township, Lorain County, on to the shore of Lake Erie, upon the condition that two sand filter beds, each about thirty feet square and of a design satisfactory to the State Board of Health, be constructed and the sewage be passed through these beds before being discharged into the lake; the sewer to be built and paid for by a number of private families; and suggesting that these filters be located near the power house and that the present sewer at

this place be also connected to them; that it would be very desirable, if it could be arranged, to have the sewage discharge on to these filters intermittently, by means of a small flush tank; and that street wash should not be admitted to the proposed sewers but should be taken care of by means of ditches.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Palmer to confirm the action of the Board approving plans, presented by A. Sanderson, mayor, for an additional or new water supply for the village of Dalton, to be obtained from a drilled well, six inches in diameter and 166 feet deep, the upper 130 feet being through sand, gravel and fire clay and the lower through shale and sand rock, located on land owned by the village on Schultz Avenue.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Crossland and seconded by Dr. Stanton, to confirm the action of the Board approving plans, submitted by the board of public service, for an additional water supply for Fostoria, to be obtained from the East Branch of Portage Creek by a new intake located near the present waterworks pumping station, provided:

First—That filters of either the mechanical or slow sand type, of a design satisfactory to the State Board of Health, be constructed before the water from said proposed new intake is delivered to consumers; and,

Second—That the drainage from the Catholic Cemetery be conveyed to a point on the creek below the proposed intake.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Palmer to confirm the action of the board approving the plans, presented by George W. Leshner, city civil engineer of Fremont, for a combined sewer in the Third Ward, extending in a generally northwesterly direction from the corner of State and Everett streets to the Sandusky River at the foot of Walnut Street, provided;

First—That the dry weather flow of sewage be conveyed well out into the river channel and not allowed to come in contact with the banks of the river; and,

Second—That the dry weather flow of sewage from the Third Ward be collected by an intercepting sanitary sewer on the east bank of the river and purified in a manner satisfactory to the State Board of Health whenever in the opinion of said Board this becomes necessary. Also calling attention to the fact that the discharge of house sewage into the Sandusky

River will probably become objectionable as the city grows, and that it would be wise at this time, especially as there are as yet few sewers on the easterly side of the river, to construct a separate system of sewers so that the domestic wastes can be collected separately and treated when necessary. That as the sewage on the westerly side of the river has already reached such large proportions, the separation of the sewage and storm water would probably not be warranted; therefore at some future time an intercepting sewer will have to be built along the westerly bank of the river to convey the dry weather flow of the sewage to a point below town where it can be purified; and that the discharge of sewage at the foot of Kentucky Avenue, as suggested by certain citizens of Fremont, should not be permitted.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Stanton, to confirm the action of the Board disapproving the plans, presented by the city engineer of Zanesville, for a combined sewer with outlet into the Muskingum River at the foot of North Seventh Street, until the city of Zanesville takes steps to procure a new source of water supply, or to filter the present water supply.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Stanton, to confirm the action of the Board, approving the plans, presented by H. M. Redd, the city engineer of Chillicothe, for a sewer to be built in Main and Poplar streets and to discharge into the Scioto River at the foot of Poplar Street through an iron pipe extending below the surface of the river, provided that sewage purification works, of a design satisfactory to the State Board of Health, be built when deemed necessary by said Board, and that the sewage which is being discharged at Poplar Street as well as the sewage from the remainder of the city, be purified at said works.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Stanton, to confirm the action of the Board approving the plans for sewerage and sewage disposal for the village of Bluffton, as shown upon drawings submitted by W. E. Myers, consulting engineer, provided:

First—That the total depth of filtering material in the filters be increased to four feet.

Second—That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used.

Third—That the entire filtration works, as shown on the plans, be constructed as soon as any of the sewers are laid; and,

Fourth—That the works be enlarged as deemed necessary by the State Board of Health.

Also the suggestion that the dosing system of the purification works be so arranged that one bed may be cut out entirely for the purpose of resting or cleaning, and that the elevation of the works be such that future additions can be made easily and in such a manner that they will be protected from the flood waters from the creek.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman, to confirm the action of the Board granting permission to Dr. E. J. Schwartz, of Salem, to disinter the body of his grandfather, who died of Asiatic cholera in 1852; and remove the body from Knox Township, Columbiana County, to Salem, the consent of the local authorities having been obtained.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Stanton, to confirm the actions of the Board approving the rules adopted by the health officer of Carthage and the health officer of New Madison. These were:

For Carthage, the rules recommended by the State Board of Health except that Rule 12 be made to read, "No privy shall hereafter be constructed without a permit from the health officer. Privy vaults or cess-pools hereafter shall be not less than eight feet, or more than ten feet in depth, with walls of stone or brick eight inches or more in thickness, cemented and made water tight; and no privy vault shall be located within fifty feet of any well," and Rule 14, two feet is changed to four feet, making the sentence read, "No privy vault shall be allowed to become filled within four feet of the surrounding ground surface."

For New Madison, the rules recommended by the State Board with the exception that in Rule 12 the words "A permit from the health officer" are omitted, and the first sentence in Rule 16 is omitted.

Those voting in the affirmative were Messrs. Chapman, Stanton, Warner, Palmer and Crossland.

In the negative, none.

There being no further business, the Board adjourned to meet at the call of the president, if deemed necessary.

Attest:

C. O. PROBST,
Secretary.

QUARTERLY REPORT OF THE SECRETARY.

January Meeting, 1905.

Mr. President and Members of the Ohio State Board of Health:

GENTLEMEN:—Your secretary begs leave to respectfully report as follows:

The smallpox conditions are somewhat improved, though the disease still prevails. During the year 1904, 3,565 cases and 82 deaths were reported, while in 1903 there were 6,814 cases and 287 deaths. For the week ending January 21, 1905, 88 cases of smallpox were reported present in 15 counties and 20 places.

Since the last meeting of the Board the principal outbreaks of the disease have been at Kingston, Ross County, and in Noble and Logan counties. The most extended outbreak at the present time is at Lima and vicinity.

Visits on account of smallpox have been made by medical inspectors to Pemberville, Kingston; Stock Township, Noble County; Green Township, Clinton County; Orange Township, Ashland County; Spring Creek Township, Miami County; Bellefontaine, Byesville; Jefferson, Center and Enoch Townships, Noble County; Washington Township, Lucas County; Macksburg, Belle Center and Glandorf.

In addition to these, Dr. Stanton visited Seven Mile on account of scarlet fever.

The health authorities of Macksburg called Dr. Moninger there to assist them in the prosecution of a man who had broken smallpox quarantine. The man was fined \$50 and costs.

Dr. Moninger also visited New Antioch, Clinton County, on account of an outbreak of scarlet fever.

Mr. Hartzell visited Youngstown in regard to sewerage.

Dr. Warner and the secretary held several conferences with the Columbus authorities relative to the city's water supply.

Dr. Crossland met with the Zanesville authorities in regard to sewerage.

The secretary visited the tuberculosis dispensary at Cleveland.

The chemist visited Conneaut to inspect their filters, a request having been made for such an inspection.

The following places were visited by the engineer, relative to sewerage or water supply: Beach Park, Lorain County; Chillicothe, Fostoria, Rocky River, East Liverpool, Urbana, Willoughby, Wellston, Zanesville, Bucyrus and Lectionia.

He also visited Lynchburg, upon the request of the Attorney-General, suit having been brought by the Fish and Game Commission against the distillery at that place for polluting the east branch of the Little Miami River. A compromise was effected by which both sides agreed to

abide by whatever plan, for preventing such pollution, the State Board of Health might suggest. A copy of the engineer's preliminary report was sent to the Attorney General.

Upon request of the health officer of Port Clinton, the engineer visited that place to inspect certain conditions relating to the sanitary condition of the village, of which complaint had been made. A copy of this report was sent to the health officer.

Complaints were received that a storm water drain at Rocky River was being made use of by citizens for domestic purposes. The engineer visited Rocky River, made an investigation, and a copy of his report was sent to the complainants, the mayor and the health officer. The health officer was advised that he should make and enforce an order prohibiting any person using this sewer to carry any household sewage or other filthy substances, which would no doubt bring about the construction of necessary sewers.

The village of Willoughby, through its mayor, requested an opinion from the Board regarding the necessity for sewerage at that place. The engineer visited Willoughby, made an investigation, and a copy of his report was sent to the mayor and the hope expressed that the necessary steps would be taken to secure a complete system of domestic sewers, without delay, in accordance with plans already approved by the Board.

The engineer also visited Vermilion to inspect the filter plant recently installed. It was found that the filtered water was fairly good (which was largely due to the good condition of the raw lake water). The results were not nearly so good, however, as those being obtained at Elyria and Lorain, under the same conditions. A letter was sent to the board of trustees of public affairs, calling their attention to this fact, and also to the fact that they had failed to place a valve in the sedimentation basin, as recommended by the State Board of Health. They were asked to send the Board weekly reports of examinations of the filtered and unfiltered water, which they were to have made.

The mayor of Urbana requested an opinion regarding the necessity for sewerage for that place. The engineer visited Urbana, made an investigation, and a copy of his report was sent to the mayor, and the hope expressed that steps would be taken at the earliest possible time to bring about needed sanitary improvements.

The city solicitor of Bucyrus requested an investigation of the sanitary conditions there with reference to the discharge of sewage into the Sandusky River. The engineer visited Bucyrus, made a report which showed conditions to be bad. A copy of this report was sent to the city solicitor and it was stated that the city should take prompt steps to install a proper sewerage system.

I have secured the name of a druggist in each county seat, who will keep on hand and distribute when needed, outfits for mailing specimens for examination in suspected cases of diphtheria, tuberculosis and typhoid

fever, and these outfits are being sent out. Many commendations from physicians, for this action of the Board, have been received.

Complaint was made that the authorities at Montpelier in building their sewer system had failed to carry the outlet to the point approved by the State Board of Health. Their attention was called to the condition of approval and they were notified that unless the outlet was extended to the point approved by the Board the matter of revoking its approval of the sewer system would be brought before the State Board of Health for consideration.

The attention of the board of public service of Alliance was called to the provision in the approval of Well No. 1, for an additional water supply, i. e., that a sewer be built to convey the effluent from the city sewage disposal works to a point below the Gaskill Street bridge; and it was suggested in connection with this extension that the sewage disposal plant itself was outgrown and that improvements should be made.

The circular adopted by the conference of State and Provincial Boards of Health of North America, in the interest of the prevention of venereal diseases, a letter and a blank asking for reports of such cases have been sent to every practicing physician in the State.

Dr. Warner, the secretary and bacteriologist, as delegates, and Dr. Chapman on his own account, attended the meeting of the American Public Health Association in Havana, Cuba, January 9th to 13th. Nearly two hundred members were present. An interesting group of papers on water purification and on the copper treatment of water, was presented. A special report of the committee on Standard Methods of Water Analysis, embracing several years work by well known men, will prove of great value. Other interesting reports and papers were read. Dr. Wesbrook, of Minneapolis, was elected president, and your secretary was re-elected secretary. Boston will be the next place of meeting.

Matters acted upon by mail vote should now be confirmed.

Respectfully submitted,

C. O. PROBST,
Secretary.

APRIL MEETING.

A regular meeting of the State Board of Health was held at the Grand Hotel, Cincinnati, April 26, 1905, at 8 p. m.

There were present Drs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Mr. Hartzell.

Mr. Albert F. Thompson, mayor of Deshler, was present and addressed the Board in reference to proposed improvements in sewerage at that place.

The secretary presented his quarterly report, which, on motion of Dr. Stanton, was approved and ordered filed for publication.

The secretary presented a report by the engineer of the Board upon the water supply of Prairie Depot (Freeport, Wood County).

On motion of Dr. Chapman and seconded by Dr. Miller the water supply of Prairie Depot, derived from a well 233 feet deep and located in the northeasterly part of the village, as shown upon plans submitted, was approved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report by the engineer upon the water supply of Miamisburg.

It was moved by Mr. Hartzell and seconded by Dr. Chapman to permit the use of water from wells located on land owned by the village, and formerly known as the Zunkel lot, pending further examinations to be made later on.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

A communication from the president of the board of public service of the city of Elyria was presented, asking the Board to modify its approval requiring the installation of sewage purification works.

On motion of Dr. Crossland and seconded by Dr. Stanton, it was voted to require that plans for sewage purification works be made at once and submitted to the State Board of Health for approval, and in case these plans are satisfactory to the Board, to permit an extension of two years time in which to build purification works after the new sewers are first put in use, provided a sufficient guarantee be given that the works will be built at the end of this period.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

A communication was presented from Mr. J. W. Emmert, Jr., of Elyria, protesting against the construction of a proposed sewer in that

city, and enclosing a copy of an ordinance providing for said sewer, as passed February 21, 1905.

On motion of Dr. Crossland and seconded by Dr. Palmer the matter was referred to the secretary for such action as he might deem necessary.

Rules adopted by the health officer of Bratenahl were presented. These were the rules recommended by the State Board except that section 12 was amended to read: "No privy shall hereafter be constructed, in any premises accessible to a public sewer, nor shall any privy be constructed in any place without a permit from the health officer. Such privy when permitted shall be a dry earth closet and no privy shall be located within fifty (50) feet of a well."

In addition to these rules the following were adopted by the health officer of Bratenahl:

Section 20. No cesspool shall be constructed hereafter on any premises accessible to a public sewer, nor shall any cesspool be constructed in any place without a permit from the health officer. No cesspool shall be located within twenty-five (25) feet of any dwelling house, nor within fifty (50) feet of any well. All cesspools shall be constructed only in accordance with plans filed with and approved by the health officer.

Section 21. No overflow pipe or outlet from any cesspool shall be permitted except by written permission of the health officer.

Section 22. No connection shall be made with any sewer except on written permit from the health officer.

Section 23. Garbage shall consist of refuse, animal or vegetable matter only, and shall be kept in covered metallic cans, provided with a handle, and of a size to be handled by one person, which can shall be placed in accessible places. Garbage shall be kept free from liquids, and no glass, tin, paper, cloth or other foreign substance shall be put in the garbage.

It was moved by Dr. Milier and seconded by Dr. Crossland that these rules be approved.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The following order regulating the sale of milk in Barberton, adopted by the health officer, was presented:

Section 1. It shall be unlawful for any person to bring or send into the village for sale, or sell or offer for sale, any milk without a written permit so to do from the health officer; which said health officer shall grant permits to all applicants on condition that their dairies and all dairies from which any person may purchase milk, are kept in a good and sanitary condition, and that they shall furnish a certificate of a licensed veterinarian, if desired by the health officer, that all cows from which milk is sold, to be in a good and healthy condition, and to comply with all the laws, ordinances and rules dealing in milk.

Section 2. That any permit so granted may be revoked by the health officer on written notice to the party, when it shall appear that the party to whom such permit has been granted has violated any law of the state or ordinance of the village of Barberton, or any rule of the health officer relative to dealing in milk, or refused to furnish a certificate of health for his cows, and refused to keep his dairy in a good sanitary condition.

Section 3. That such permits, subject to such revocation shall be good for a period of six (6) months from the first day of January and July of the year of issue, and shall pay to the health officer the sum of twenty-five (25) cents for issuing the same.

Section 4. That before obtaining any such permit, the applicant shall state to the health officer:

First—His name and place of business.

Second—The number of cows, if any, owned by him.

Third—The name and place of business of any or all persons from whom he purchases milk.

Fourth—The daily amount of milk purchased, and the daily amount of milk sold by him, so near as he can estimate the same.

Fifth—The health officer shall keep a record of such statements for public inspection.

Section 5. That any person violating any of the foregoing orders or rules, shall upon conviction be fined according to the statutes herein made and provided.

On motion of Dr. Stanton and seconded by Dr. Miller, this order was approved.

Those voting in the affirmative were Messrs Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a communication from Mr. John H. Riley, president of the board of public service of Marietta, requesting the Board's approval of the use of sulphate of copper in a test to be made of the new mechanical filter plant for that city.

On motion of Dr. Crossland and seconded by Dr. Miller, the secretary was instructed to notify the authorities at Marietta that the Board was unwilling to grant them permission to use sulphate of copper in this manner, owing to its present insufficient knowledge of the action of this chemical used in a public water supply.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report by the engineer upon plans of The Riggs & Sherman Company, for sewerage for the village of Delta, with outlet into Bad Creek.

It was moved by Dr. Crossland and seconded by Dr. Palmer to disapprove these plans unless sewage purification works, satisfactory to the

State Board of Health, are constructed before the sewers are used; and to state to the consulting engineers that it would be necessary at the beginning to construct only a portion of the ultimate purification works, which would mean comparatively little expense.

Those voting in the affirmative were Messrs Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report by the engineer upon a water supply for the village of Delta; to be obtained from a deep well located beneath the power station of the Toledo & Indiana Railroad Company and owned by that company.

It was moved by Dr. Miller and seconded by Dr. Chapman that this source be approved as a public water supply upon the condition that the Board reserve the right to condemn it and cause the village to seek another supply if at any time this well becomes organically contaminated.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report by the engineer upon a sewer at Deshler, located in Park Street near Main Street and extending along Park Street to North Street, thence southeasterly in North Street to the Cincinnati, Hamilton & Dayton Railroad, where it intercepts an old drain and continues in a southeasterly direction as far as the corporation line, where it discharges into a county ditch.

It was moved by Dr. Chapman and seconded by Dr. Miller, to approve the outlet of this sewer into the county ditch, as at present, or into Brush Creek at a point well removed from any houses; provided the village council pass an ordinance prohibiting the use of this sewer for domestic wastes other than those wastes which are now being discharged from the Fayram hotel building, and upon the condition that proper sewage purification works be built at any time a nuisance may be created. Also to advise that under present conditions it would be desirable to extend the outlet to Brush Creek at a point well removed from any dwellings, plans showing the exact location of such future outlet to be submitted to the State Board of Health for approval as soon as this location is decided upon.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The minutes of the last meeting were then read and, on motion of Dr. Chapman, approved.

Matters previously acted upon by mail vote were taken up as follows:

It was moved by Dr. Miller and seconded by Dr. Stanton, to confirm the action of the Board approving the plans for softening and filtering the public water supply of Columbus, presented by the city engineer, Mr. Julian Griggs, subject to the following provisions:

(a) That detailed plans showing fully the works as they will be after construction together with a description of operative procedure, so far as these may be determined in advance of operation, be submitted to the Board for approval as soon as practicable;

(b) That laboratories be established, and that daily, and if necessary more frequent, examinations be made of the raw and purified water to determine the degree of softening and purification effected, which shall at all times be satisfactory to the State Board of Health.

As it is highly desirable that the water delivered to the filters be as free from pollution as possible, the Board also suggests that proper steps be taken to guard the water flowing from the dam to the intake against sewage or other sources of contamination, and that the next General Assembly be requested to provide for purifying the sewage of the Girl's Industrial School, which is now discharging its sewage into the Scioto River, the source of water supply, about thirteen miles above the site of the dam.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Chapman, to confirm the action of the Board approving the plans for a water purification plant for the city of Toledo, as presented by the city engineer, Mr. F. L. Consaul, subject to the following provisions:

First—That all details relating to the construction of the plant, kind of coagulant to be used, and methods of operating, be submitted to the State Board of Health for its approval before the plant is constructed.

Second—That a laboratory be established at the filtration works and that analyses of the raw and filtered water be made daily, and oftener during the high stages of the river when the character of the raw water is likely to change suddenly.

Third—That in the operation of the plant a degree of efficiency shall be maintained at all times satisfactory to the State Board of Health.

As it has been shown by experiment that in the filtration of turbid waters it is very desirable to allow a certain amount of preliminary subsidence of the water before the coagulant is introduced, the Board would suggest that in making details of the plant the wisdom of providing for such preliminary subsidence be carefully considered.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Chapman, to confirm the action of the Board approving an additional water supply for Lynchburg, to be obtained from a well owned by the distillery company and located one and one-fourth miles northeast of the village, provided that it be safely protected from the entrance of surface water; and approving

the area within 150 feet of the present well as a location for other wells provided the water from such future wells proves satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Palmer, to confirm the action of the Board approving plans for proposed sewers for the Milan Street district, and for a proposed trunk or relief sewer in Elm Street, Norwalk, provided these proposed sewers be used for the drainage of surface water or ground water only, and that the council of Norwalk first pass and file with the State Board of Health an ordinance forbidding the tapping of these sewers, or any sewers tributary thereto, for the purpose of admitting household wastes of any kind. Such ordinance need not only apply to house connections already made with present sewers, which sewers, as shown on plans, are to connect with the proposed sewers; but such ordinance must forbid the future use of said present sewers for household sewage; also directing that a note be sent to the authorities at Norwalk regarding sewerage conditions there and urging them to take immediate steps to have plans made which will determine the best and most practicable method of collecting and disposing of household wastes of the city as regards both present and future needs.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Miller and seconded by Mr. Hartzell, to confirm the action of the Board approving the rules adopted by the health officers of the following places: Carthage, Fairport, Felicity, Marshallville, Mendon, Ripley and Seven Mile. These were:

For Carthage, the rules as recommended by the State Board, amending Section 12 to read, "No privy shall hereafter be constructed without a permit from the health officer. Privy vaults or cesspools hereafter shall be not less than 8 feet, nor more than 10 feet in depth, with walls of stone or brick 8 inches or more in thickness, cemented and made water tight; and no privy vault shall be located within 50 feet of any well." In Section 13, 2 feet is changed to 4 feet.

For Fairport, the rules recommended by the State Board, and in addition a section reading as follows: "Every physician and midwife shall on or before the last day of each month report to the health officer each birth occurring within the village of Fairport at which he or she has professionally attended or advised, said report to be made upon blanks furnished by the health officer;" and amending Section 15 to read: "Privies, privy vaults and cesspools shall be cleaned between 10 p. m. and 4 a. m., and the contents thereof shall not be placed or buried within the limits of the village of Fairport without the permission of the health officer. The

price for cleaning them to be \$1.00 per barrel for the first barrel and then 50 cents per barrel for remainder. No person shall clean a privy, privy vault or cesspool without permission from the health officer."

For Felicity, the rules recommended by the State Board, amending Section 16 to read: "No hogs shall be kept within the village more than twenty-four hours between the months of April and November without permission from the health officer."

For Marshallville, the rules recommended by the State Board except that Section 11 and Section 12 are made into one section, Section 11 reading: "Privies and privy vaults shall be cleaned and kept according to orders of the health officer;" and Section 16 is made to read: "Hogs may be kept within the village by keeping pens clean according to orders of the health officer."

For Seven Mile the rules recommended by the State Board omitting Section 16 relating to hogs, slaughter houses and fertilizer.

For Mendon and for Ripley, the rules as recommended by the State Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary reported that he had consulted the Attorney General in regard to the communication previously presented to the Board from the Tobacco Growers and Farmers' Union, at Germantown, requesting the Board to investigate the danger of spreading contagious disease from the manner of handling tobacco.

On motion of Dr. Chapman the matter was referred to Dr. Stanton for investigation and report.

It was moved by Dr. Stanton and seconded by Dr. Miller, that cerebro-spinal meningitis be added to the list of diseases required to be reported by physicians to local health authorities.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

On motion of Dr. Chapman it was voted to hold the June meeting, 1905, in Cleveland.

On motion of Dr. Palmer it was voted that this meeting should be held on June 14th.

There being no further business, the Board adjourned.

Attest:

C. O. PROBST,
Secretary.

QUARTERLY REPORT OF THE SECRETARY.

April Meeting, 1905.

Mr. President and Members of the Ohio State Board of Health:

GENTLEMEN:—Your secretary begs leave to present the following report:

The winter has closed with a comparatively small number of cases of smallpox. The total number of cases reported since January 1st to April 22d, was 560, with three deaths. Last year, during practically the same period, to-wit: from January 1st to April 23d, there were 1,884 cases and 52 deaths reported. The disease is now present in the following counties: Allen, Ashland, Belmont, Brown, Fairfield, Franklin, Hamilton, Hancock, Logan, Lucas, Mercer, Ross and Scioto.

On account of smallpox, visits were made by Dr. Chapman to Latty, Sylvania, Gibsonburg, Washington Township, Lucas County, and West Leipsic. The disease was found at all places except West Leipsic.

Dr. Stanton visited Oakley, Hamilton County.

Dr. Moninger visited Orange Township, Hancock County; Arlington, Hancock County, and Marion Township, Fayette County. In the latter case the disease was found to be not smallpox.

Dr. Platter visited Pomeroy, where he found chickenpox, and Clarks-ville, where they were having scarlet fever.

Dr. Chapman, as a member of the committee, met with the Toledo officials in regard to their water filtration plant.

Dr. Crossland, as a committee investigated the water supply of a tube mill in Zanesville, brought about by reason of complaints made by the local health authorities to the Board.

Dr. Warner and the secretary held several conferences with the Columbus authorities in regard to the water filtration plant proposed for that city.

The secretary read papers on the subject of tuberculosis before the following societies:

Delaware County Medical Society, at Delaware.

Sandusky County Medical Society, at Fremont.

Champaign County Medical Society, at Urbana.

Crawford County Medical Society, at Galion.

Cleveland Academy of Medicine.

He also attended the meeting of the executive committee of the National Association for the Study and Prevention of Tuberculosis, held in New York April 14th.

During his visit to Columbus, Dr. S. A. Knopf, of New York, accompanied Dr. Warner and the secretary to the penitentiary and inspected the sanitary conditions prevailing there. He prepared a short report which was published in the papers and which created considerable editorial comment favorable to a new penitentiary.

The engineer visited the following places in regard to a water supply: Delta, Lynchburg, Toledo, Fredericktown, Monroeville, Norwalk, Prairie Depot (Freeport), Miamisburg and Arcanum. Deshler was also visited in regard to sewerage.

In response to a request from the council of Portsmouth, the engineer visited that city in regard to the necessity, desirability and general methods for improving the water supply of Portsmouth. A copy of his report was sent to the council, and the hope expressed that they would take steps to actively push on the work of securing a pure water supply.

The consulting engineer for the village of Fredericktown asked the Board's advice in regard to the best location for wells from which to obtain a water supply for that village. The engineer of the Board visited Fredericktown and made a report, a copy of which was sent to the consulting engineer.

Matters acted upon by mail should now be confirmed by a *vis a voce* vote.

Arrangements were entered into with the United States Geological Survey for the joint investigation authorized at the last meeting. Studies are being made of the wastes from the Shelby tube works and the Lynchburg distillery. A series of examinations were made of the Mansfield sewage disposal works, i. e., of the sewage and effluent, which showed a good degree of purification effected.

I have a report to offer of work done in the laboratory.

Respectfully submitted,

C. O. PROBST,
Secretary.

JUNE MEETING.

A regular meeting of the State Board of Health was held at the Hollenden Hotel, Cleveland, on June 14, 1905, at 8 p. m.

There were present Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

The minutes of the April meeting were read and approved.

The secretary presented his quarterly report, which, on motion of Dr. Stanton, was approved and ordered filed for publication.

The secretary presented a report by the engineer upon a water supply proposed for the village of Arcanum.

It was moved by Dr. Miller and seconded by Dr. Stanton to approve a location for wells from which to derive a public water supply for the village of Arcanum, said location being land situated immediately east of the D. & U. Railroad and approximately 1,000 feet south of the Big Four Railroad near its junction with the D. & U. Railroad, provided that the land within 300 feet of any well be owned or controlled by the village and that no source of pollution, which in the opinion of the State Board of Health would affect the public water supply, be allowed within 300 feet of any well.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report by the engineer upon a filtration plant for the city of Fostoria.

The report was adopted and on motion of Dr. Chapman, seconded by Mr. Hartzell, it was voted to approve plans, submitted by Mr. C. J. Peters, consulting engineer, June 13, 1905, for a proposed slow sand filtration plant to be used for filtering both the present and the proposed additional water supply for the city of Fostoria; said plans providing for two sand filters, each .26 of an acre in area, having concrete bottoms and sides and containing at least four feet of filtering material, provided:

First—That the filters and also the clear water basin be covered whenever, in the opinion of the State Board of Health, it is shown that proper results at Fostoria cannot be obtained with the uncovered filters.

Second—That the bottom six inches of filtering material be composed of clean gravel or broken stone, all of which will pass through a screen having a 2.5 inch mesh and which will be retained upon a screen having a 1-inch mesh; that the next three inches above shall be composed of clean gravel or broken stone, all of which will pass through a screen having a 1-inch mesh but be retained upon a screen having a clear mesh of $\frac{3}{8}$ of an inch; that the next three inches be composed of fine broken stone or gravel, all of which will pass a screen having a clear mesh of $\frac{3}{8}$ of an inch but which must be coarser than the sand used for the upper portion of the filter, and be entirely free from clay, dust or other fine

material; that the upper three feet of the filtering material be composed of sand of the same size and character as the sample of "local bank" sand, marked No. 2, submitted to the State Board of Health on June 12, 1905, for inspection, by the consulting engineer, after all stones greater than $\frac{3}{8}$ of an inch in diameter have been removed from said sample; or be composed of sand, representative samples of which will fulfill the following requirements: Not more than 10 per cent. shall pass the sieve having a clear mesh of .27 of a millimeter, and at least 10 per cent. shall pass a sieve having a clear mesh of .40 of a millimeter; at least 70 per cent. shall pass through a clear mesh of .83 of a millimeter, and at least 90 per cent. shall pass through a clear mesh of 2.5 millimeters (about $3\frac{1}{32}$ of an inch); sand shall be practically free from clay, dust or organic impurities and shall be washed before being placed in the filter, if deemed necessary by the State Board of Health.

Third—That if the sand represented by the above mentioned sample No. 2 of local bank sand is used, such sand shall either be washed before being placed in the filters or else the water which first passes through the filters shall be wasted until found, upon examination by the State Board of Health, to be free from any clay or organic matter taken up from the filtering material.

Fourth—That the old gravel filter near the pumping station be abandoned and that the entire public water supply of Fostoria be passed through the new proposed filters.

Fifth—That the water direct from the creek through the new intake be used only when such water is clear.

Sixth—That any change in the management or operation of the filters be made when requested by the State Board of Health.

Those voting in the affirmative upon the question of approval were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report of his attendance upon the meetings of the Conference of State and Provincial Boards of Health of North America; representatives of State Boards of Health with the Surgeon General of the Public Health and Marine Hospital Service; and the National Association for the Study and Prevention of Tuberculosis; all held in Washington May 15 to 20, 1905.

On motion of Dr. Stanton the report was approved for publication.

Dr. Stanton, who was appointed a committee to investigate the complaint made by the Tobacco Growers and Farmers' Union, in reference to the improper handling of tobacco, made a report of his investigation, and recommended that an effort be made to secure such regulations, by legislative action or otherwise, for the handling of all tobacco products as to render their use as free as possible from danger of the transmission of at least those diseases which are of microbic origin.

On motion of Dr. Chapman the report and recommendation were adopted.

The secretary presented correspondence from Mr. James Kinney, Jr., of Bellaire, relative to the leasing of lands belonging to the Woodsfield Water Company for oil and gas purposes.

On motion of Dr. Chapman it was voted to take no action in the matter except to inform Mr. Kinney that the Board would be willing to make the investigation in accordance with the terms of the proposed lease whenever called upon to do so.

The secretary presented a communication from the city solicitor of Elyria, relative to a complaint in regard to a proposed sewer in Middle Avenue and Fourteenth Street; the city solicitor stating that this was a purely storm water sewer and would have no connection with their sanitary system.

Matters previously acted upon by mail were taken up as follows:

It was moved by Dr. Chapman, seconded by Dr. Palmer, to confirm the action of the Board approving plans, presented by Mr. T. W. Vance, clerk of the council of Steubenville, for two proposed sewers in that city, each sewer to be 30 inches to 36 inches in diameter; one in Washington Street and one in North Street, to discharge into the Ohio River at the foot of Washington Street and North Street, respectively, and to have the outlets so constructed that the dry weather flow will be discharged below the lowest level of the river.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton, seconded by Mr. Hartzell, to confirm the action of the Board approving plans for sewerage and sewage purification for the village of Ravenna, presented by W. E. Myers, as consulting engineer, May 12, 1905, the site for such purification works being immediately south of the old location of the Baltimore & Ohio Railroad and about 500 feet west of Diamond Street, provided:

First—That the waste liquors from the Cleveland Woolen Company's mill be treated in a manner satisfactory to the State Board of Health before being discharged into the purification works.

Second—That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used; and,

Third—That the purification works be built before any of the proposed sewers are used.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer, seconded by Mr. Hartzell, to confirm the action of the Board approving plans for sewerage and sewage puri-

fication for the village of Leetonia, as shown on drawings submitted by Messrs. Williams and Whitman, consulting engineers, May 17, 1905, provided:

First—That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used.

Second—That the septic tank and contact beds be constructed before any of the sewers are put in use; and,

Third—That the sand filter beds be installed when deemed necessary by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton, seconded by Mr. Hartzell, to confirm the action of the Board approving plans for sewerage for Norwood, submitted by Mr. J. A. Stewart, the city engineer, on May 26, 1905, the plans providing for the discharge of the sewage of the city of Norwood, by gravity and by pumping, into the proposed Bloody Run sewer of the Cincinnati system (which will connect with the proposed Mill Creek interceptor).

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Miller, seconded by Dr. Palmer, to confirm the actions of the Board approving the rules adopted by the health officers of Silverton and Uniopolis. These were:

For Silverton, the rules recommended by the State Board, adding to Section 12, "All privy vaults hereafter shall be not more than 8 feet deep," and eliminating that part of Section 16 relative to hogs.

For Uniopolis, the rules recommended by the State Board of Health amending Section 16 to read, "No live hog or hogs shall be kept within the village unless the enclosure in which they are kept is at least 150 feet from any building used as a dwelling, and 150 feet from any water well or spring which is used for domestic purposes."

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The election of officers was called for.

Dr. Stanton nominated Dr. W. C. Chapman as president, to take his seat at the October meeting. This motion was seconded by Mr. Hartzell.

The secretary was instructed to cast the ballot of the Board for Dr. Chapman as president. The secretary announced that he had cast the ballot, as directed, and Dr. Chapman was declared elected president.

Dr. Miller nominated Mr. Hartzell for vice-president, and moved that the secretary be directed to cast the ballot for Mr. Hartzell. The motion

was seconded by Dr. Palmer and carried. The secretary announced that Mr. Hartzell was elected vice-president.

The Board then adjourned to the call of the president.

Attest :

C. O. PROBST,

Secretary.

QUARTERLY REPORT OF THE SECRETARY.

June Meeting, 1905.

Mr. President and Members of the Ohio State Board of Health:

GENTLEMEN:—Your secretary begs leave to present the following report:

Smallpox cases are still being reported; the total number of cases reported since April 22d is 163, with no deaths. The disease is now present in the following counties: Butler, Clermont, Fulton, Hamilton, Hardin, Huron, Lucas, Marion, Mercer, Morrow and Paulding. A number of cases have occurred at Celina and at Kenton, from which points the disease has been carried to neighboring towns and townships.

Visits were made by medical inspectors on account of smallpox to Fayette, New London, Fulton Township, Fulton County; Washington Township, Lucas County, and to Williamsburg by Dr. Stanton.

The mayor of Williamsburg requested the Board to investigate a suspicious case and Dr. Stanton visited that place on May 30th. He diagnosed the disease smallpox and traced its origin to a dental student from Cincinnati who had visited there, but later left for California. The village was without a board of health or a health officer. The mayor was given instructions for looking after the case, and was informed that if a board of health or a health officer was not appointed at once the State Board of Health would appoint such an officer. Dr. G. L. Hines has been appointed health officer in lieu of a board of health. No new cases of smallpox have been reported.

Dr. Chapman being away, upon request Dr. Brand, of Toledo, visited Fulton Township, Fulton County, where he found a case of smallpox and considerable exposure. He gave instructions for quarantine and for disinfecting the hardware store with which the patient had been connected. Four cases have since been reported.

On May 18th the mayor of New London requested the Board to investigate a disease that had been prevailing there for some weeks, and which the local physicians had been calling chickenpox. Dr. Platter was sent to New London, diagnosed the disease a mild form of smallpox. There had been about twenty-five cases. He met with the mayor and health authorities and gave instructions in regard to quarantine, disinfection, etc. Thirteen cases have since been reported in New London and neighboring townships.

June 5th, upon the request of the health officer, Dr. George Chapman visited Fayette, where he found a case of smallpox in the person of a motorman on the Toledo and Western Railroad. Instructions were given the health officer, and no other cases have been reported.

June 6th, Dr. George Chapman visited Washington Township, Lucas County, where he found a case of smallpox. He had the patient removed

to an isolated cottage, the house fumigated, and all exposed persons vaccinated. No history of exposure could be learned.

Scarlet fever has been reported in a number of places in mild form. May 13th a telegram was received from Barton, a village in Colerain Township, Belmont County, protesting against the closing of a church and parish school by the local health authorities on account of this disease. Dr. Heinlein was sent to the village and upon investigation reported that since February there had been from twelve to fourteen cases, with three deaths. He advised the health authorities to place guards over houses in which the disease existed, to enforce strict quarantine and thorough disinfection, and to reopen the school. No cases have since been reported.

It was reported to the Board that scarlet fever was prevailing at Upper Sandusky and that proper quarantine was not being enforced. Dr. Platter was sent to Upper Sandusky on June 2d. He found that the disease had been called "rash" on account of its mild type. Full instructions were given the authorities for quarantine and fumigation.

Dr. Stanton, as a committee, visited Germantown on May 28th, to investigate the complaint made by the Tobacco Growers' and Farmers' Union, and has presented a report.

Dr. Stanton also visited Norwood relative to sewerage.

The bacteriologist visited Vermilion to inspect the water filters.

The engineer visited Steubenville, Leetonia, Ravenna and Norwood in reference to sewerage; and Marion to inspect the plant there.

May 15th to 20th I visited Washington, D. C., and have prepared a report of the meetings held there which I will present at your pleasure.

The following letter, relative to reports of cases of cerebro-spinal meningitis, was sent to all boards of health in the State and to the medical journals:

STATE OF OHIO
STATE BOARD OF HEALTH
Office of the Secretary.

Columbus, Ohio, May 1, 1905.

REPORTS OF CASES OF CEREBRO-SPINAL MENINGITIS.

To Boards of Health and Health Officers:

Section 2125 R. S. provides that attending physicians shall report certain diseases to the boards of health within whose jurisdiction such cases are found. In addition to the list of diseases given therein, the section also provides that physicians shall report such other diseases as may be "required by the State Board of Health to be reported."

At a meeting of the State Board of Health held April 26, 1905, it was voted to add "cerebro-spinal meningitis" to the list of diseases which physicians are required to report to the local health authorities. You should have this announcement made in one or more papers of general circulation in your community.

In taking this action the Board does not mean to class this disease among the contagious diseases. It is not thought to be contagious, and there is no

good proof that it may be communicated from one person to another. The State Board, therefore, will not require quarantine or other preventive measures usually followed in contagious diseases. The health authorities of the city of New York where the disease has been widely prevalent have not considered it necessary to enforce such measures. As it is not absolutely certain, however, that this disease may not rarely, under unknown conditions, be communicated from one person to another, there can be no objection if your board of health deems it necessary, to provide for isolation of the patient, disinfection of the house and a private burial in such cases. Yours truly,
By order of the Board. C. O. PROBST, M. D.,
Secretary.

Matters acted upon by mail should now be confirmed by a *viva voce* vote.

Respectfully submitted,

C. O. PROBST,
Secretary.

AUGUST MEETING.

A special meeting of the State Board of Health was held at the Boody House, Toledo, on Wednesday evening, August 16, 1905, at 8 o'clock.

There were present Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

Mr. H. O. Pond, president of the board of public service; Mr. Julian Griggs, city engineer, and Mr. John H. Gregory, principal assistant engineer, presented plans for a sewage disposal plant for the city of Columbus, which they asked to have approved.

Mr. J. W. Barry, an attorney of Mt. Gilead, asked the advice of the Board in regard to the payment of a bill contracted by a township board of health for medical attendance and other care in smallpox cases coming from another county.

Mr. W. W. Dunipace, health officer of Webster Township, and Mr. J. D. Anderson, health officer of Center Township, Wood County, asked the Board's assistance in the abatement of an alleged nuisance caused by the sewage of Bowling Green. It was stated that a number of cases of typhoid fever had occurred, which it was believed had been caused by this sewage pollution. The secretary reported that the engineer had recently made an investigation of this complaint, and that there was no doubt that a nuisance existed; that plans for a sewerage system for Bowling Green had been approved by the State Board of Health some time ago, subject to the condition that a sewage purification plant be installed within a certain time; that this time had expired, but that no action had been taken by the Bowling Green authorities, though they had recently stated that it was the expectation to put in a sewage disposal plant.

On motion of Mr. Hartzell, it was voted to refer this matter to the Attorney-General for his opinion as to whether the local board of health, the State Board of Health, or both, had authority to compel Bowling Green to take the necessary steps to abate this nuisance.

Plans for a new water supply for the Ohio Institution for the Deaf and Dumb, at Columbus, to be obtained from driven wells, 60 or 70 feet deep and located within the institution grounds, were presented by Mr. Thomas Cureton, the consulting engineer. The secretary also read a report by the engineer of the Board upon the proposed supply.

It was moved by Mr. Hartzell and seconded by Dr. Stanton, to approve the supply, provided the water be purified in a manner satisfactory to the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The minutes of the last meeting were read and approved.

The secretary presented his quarterly report, which, on motion of Dr. Stanton, was approved and ordered filed for publication.

The following order, prepared by the health officer of Barberton, acting in lieu of a board of health, was presented:

Be it ordered by the health officer of the village of Barberton, State of Ohio, that,

Section 1. It shall be unlawful for any person, firm or corporation to throw or deposit, or cause to be deposited, upon any lot, parcel of land, street, alley, public ground or open place, within the limits of the village of Barberton, Ohio, any rubbish, offal, paper, rags, filth, dirt, cinders, decayed fruit, or vegetables, or animal matter inimical to public health; unless same shall be placed in a tin or metal can with tight bottom and cover and what is commonly known as a garbage can; provided nothing herein shall be construed to interfere with any improvement, public or private.

Any person violating any of the provisions of this order shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in any sum not exceeding \$50 and costs of prosecution.

Section 2. That an order issued by the board of health and passed Sept. 25, 1903, be and the same is hereby repealed.

Section 3. This order shall take effect, and be in force from and after its approval by the State Board of Health and its legal publication.

Passed this 11th day of August, 1905.

W. A. MANSFIELD,
Health Officer.

Dr. Stanton stated that in his judgment the health officer had no authority to insert a penalty clause in the order.

It was moved by Dr. Stanton and seconded by Dr. Crossland that the order be approved with the exception of the penalty clause.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

Dr. Warner reported in regard to a nuisance which had been committed on a railway train, and which had been referred to him by the superintendent of the road, for advice as to the authority for the prevention of such nuisance.

On motion of Mr. Hartzell the secretary was instructed to present a hypothetical case, similar to the one presented, to the Attorney-General for an opinion as to what action, if any, could be taken in such cases.

On motion of Dr. Chapman it was voted to refer the plans for a sewage disposal plant for the city of Columbus to the president, secretary and engineer of the Board, for investigation and report.

The secretary was instructed to say to Mr. J. W. Barry, of Mt. Gilead, that the Board was of the opinion that the board of health of Congress Township would be bound to pay the expenses incurred in

looking after smallpox cases, and that they should proceed to collect the amount so paid from the county (Lucas) where the patients had a legal residence.

Matters previously acted upon by mail were taken up for confirmation as follows:

It was moved by Dr. Stanton and seconded by Dr. Chapman to confirm the action of the Board approving the plans presented by Mr. Thomas Cureton, consulting engineer, for a public water supply for the village of Fredericktown, to be derived from wells located on territory immediately west of the westerly corporation line of Fredericktown, and immediately south of High Street, provided that the land within 400 feet of any well which may be used in connection with said water works be owned or controlled by the village and that no source of pollution, which in the opinion of the State Board of Health will affect the public water supply, be allowed within said 400 feet of any well.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Palmer to confirm the action of the Board approving the plans for a new water supply, water filtration plant and distribution system for the city of Newark, made by Mr. Lewis K. Davis, of Pittsburg, submitted July 18, 1905, provided:

First—That the slow sand filters be covered with a substantial roof.

Second—That a filtration plant be included in the construction of the first portion of the proposed works; and,

Third—That any change in the operation of the plant be made when requested by the State Board of Health.

These plans provide for:

(a) The use of the water from the North Branch of the Licking River to be taken at a point about one-fourth mile above the present water works;

(b) For the purification of this water by slow sand filtration with preliminary rapid filtration through broken stone and sponge clippings, together with the use of alum to obtain coagulation at times when the high turbidity of the river renders this necessary; and,

(c) A distribution system consisting of about twenty miles of water mains into which the water is to be pumped continuously.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Chapman to confirm the action of the Board approving plans for sewage for Norwalk as follows: Storm sewers proposed in Milan Street, St. Marys Street, North Garden Street and Harkness Street, as shown on the blue print

and described in the application of the street committee of the city council and the city engineer, under date of June 24, 1905; and in addition the use of the above sewers for house drainage for a period of one year from date of completion, upon the condition that the council pass an ordinance providing for a general plan of sewerage and sewage disposal satisfactory to the State Board of Health, for the entire city; and for the construction of sanitary sewers in the above named streets as soon as such general plan is completed and approved by the State Board of Health; and that a certified copy of such ordinance be filed with the State Board of Health as soon as passed:

Also approving the proposed overflow sewer in East and West Elm Street, from Linwood Avenue westerly to Norwalk Creek at Pleasant Street; said sewer to be so constructed that it will receive no sewage except at such times as the present sewers in Maple Street, Norwood Avenue, Benedict Avenue and South Linwood Avenue are running at a depth of three-fourths of the diameter of the pipe.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

[The council of Norwalk has taken steps toward conforming with these conditions.]

It was moved by Dr. Palmer and seconded by Dr. Stanton to confirm the Board's action disapproving the plans made by Mr. Fred C. Elliott, for a proposed new sewer outlet for the Jefferson County Infirmary, near Steubenville, into Permar's Run, unless a sewage purification plant, satisfactory to the State Board of Health, be first constructed and the sewage purified by it before being discharged into the run.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Mr. Hartzell to confirm the action of the Board approving the plans of The Riggs and Sherman Company, consulting engineers, submitted July 10, 1905, for sewage purification for the village of Delta, provided that the sand area be increased when deemed necessary by the State Board of Health. Also advising:

First—That the valve controlling the by-pass leading from the grit chamber into the creek be closed and sealed by the health officer of Delta, and that this by-pass be used only in an emergency and with the knowledge of the health officer; and,

Second—That while either system of operating the dosing tank would be satisfactory if properly adjusted and occasionally looked after, the size of the tank should be such that each dose will not exceed 1,000 gallons.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Palmer to confirm the Board's action approving the plans presented by C. B. Curfman, city engineer, of Steubenville, for a 36-inch brick sewer in Adams Street and a similar sewer in Logan Street, Steubenville, submitted July 8, 1905, to discharge at the foot of Adams Street and Logan Street, respectively, and to have outlets so constructed that the dry weather flow will be conveyed below the lowest level of the river at all times.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Chapman to confirm the action of the Board approving the plans of The Riggs and Sherman Company, consulting engineers, for sewerage and sewage purification for Chicago Junction, submitted July 10, 1905, provided the sand area be increased when deemed necessary by the State Board of Health; it being understood that the area of land upon which this purification works is to be located is to be of a size satisfactory to the Board.

Also advising that the valve controlling the by-pass leading from the grit chamber into the creek should be closed and sealed by the health officer of Chicago, and that this by-pass should be used only in an emergency and with the knowledge of the health officer; and, that while either system of operating the dosing tank would be satisfactory if properly adjusted and occasionally looked after, the size of the tank should be such that each dose will not exceed 2,000 gallons.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Mr. Hartzell and seconded by Dr. Stanton to confirm the action of the Board approving the plans submitted July 10, 1905, by Frank R. Fauver, city auditor of Elyria, showing modifications in the sewerage plans for Elyria, made by The Riggs and Sherman Company and approved September 22, 1904, subject to the same conditions as those under which the former proposed outlets were approved in September, 1904; said modifications consisting principally in the relocation of the main outlets so that these outlets will be 2,700 feet north of the junction of the east and west branches of Black River.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Crossland to confirm the action of the Board approving plans for the purification of the water supply of Shelby, submitted by Mr. J. C. Fish, superintendent of the Shelby Water Company, on August 2, 1905, said plans providing for the removal of iron by a process of aeration and subsequent filtration through cork.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Chapman and seconded by Dr. Palmer to confirm the actions of the Board approving the rules adopted by the health officers of McComb and Stockport, which were as follows:

For McComb, the rules and regulations recommended by the State Board of Health, adding to Section 15 "And that no barn or stable shall be built within fifty (50) feet of any private residence."

For Stockport, the rules and regulations recommended by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

An invitation was extended to the Board to visit the proposed intake for the new water supply for the city of Toledo on Thursday morning.

Adjourned to call of president.

SECOND SESSION.

Thursday, August 17, 1905.

On the banks of the Maumee, at the site proposed for the intake for Toledo's water supply, the Board met at 10:30 a. m.

All members were present except Dr. Stanton and Dr. Miller, they having been called home.

On motion of Mr. Hartzell the Board passed a vote of thanks to Mr. John Stollberg, president of the board of public service of the city of Toledo, for his courtesies in arranging for the Board to inspect the proposed site for the city's waterworks in an expeditious and agreeable manner.

There being no further business, the Board adjourned.

Attest:

C. O. PROBST,
Secretary.

QUARTERLY REPORT OF THE SECRETARY.

August Meeting, 1905.

Mr. President and Members of the Ohio State Board of Health:

GENTLEMEN:—Your secretary begs leave to present the following report:

The smallpox situation has greatly improved, there having been but 78 cases and one death reported since the last meeting, June 14th.

Visits have been made on account of smallpox, or suspected smallpox, as follows:

Dr. Chapman visited Swanton; Dr. George Chapman, Fayette; Dr. Moninger, Pitt Township, Wyandot County; Greenville, and Walnut Township, Pickaway County; and Dr. Platter visited Stoutsville. At Walnut Township, Pickaway County, the disease was diagnosed chickenpox; and at Pitt Township, Wyandot County, pemphigus.

Diphtheria having appeared in a railroad camp near Madison, Dr. Palmer visited that place July 28th, and reported that proper quarantine was being enforced.

July 13th, Dr. Warner visited Delaware to examine into the question as to whether a fire-clay works in that city was a nuisance to the surrounding residents. He reported that a number of kilns with low smoke stacks were burning, considerable light smoke from which was of an irritating character to the throat and lungs, and that considerable vegetation had been destroyed in the neighborhood, presumably by the gas. The matter was referred to Prof. Edward Orton for advice as to the best way of dealing with problems of this kind in the State. Prof. Orton made a report in which he said the nuisance could be avoided by diluting the gases with pure air until the fumes became innocuous; by removing the fumes from the kiln gases by washing them with water; or by the use of tall chimneys, which would greatly reduce if not wholly remove the nuisance.

Mr. Elliott, representing the fire-clay company, and Dr. Bonner, the health officer of Delaware, met the secretary, at his request, and the matter was fully discussed. Mr. Elliott agreed that the company should take up the matter at once with the expectation of being able to increase the height of present chimneys sufficiently to abate or largely remove the nuisance. A copy of Prof. Orton's report was furnished to the health officer and to the company.

July 22d, Dr. Warner visited Lakeside to inspect the filters and the sanitary condition of that place. He reported the general health of the people to be good; that he could learn of no cases of typhoid fever, and that while there had been two cases of diphtheria, one fatal, the latter part of May, after broad inquiry he felt safe in saying that there is no diphtheria there now. He reported that the filters were producing a

water free from turbidity and seemed to be doing good work, but suggested that it might be advisable to construct another tank, to act as a reservoir to receive the water after it leaves the filters, to give a more regular supply and to prevent crowding of the filters at certain hours of the day.

August 9th the bacteriologist visited Upper Sandusky to inspect filters, which had been installed without the approval of this Board.

The following visits were made by the engineer: With reference to present or a new water supply: June 15, Plymouth; June 19, Loveland, Blanchester and Wilmington; June 30, Sandusky; July 11, Indianapolis (to inspect filters similar to those to be installed by Newark); July 12, Leesburg; August 4, Youngstown and Struthers; August 5, Painesville. With reference to sewerage or sewage purification: June 23, Elyria (in regard to proposed changes in plans); June 24, Norwalk; June 28, Kennard (to inspect gravel bank in reference to the sewage disposal plant at Marion); July 5, Steubenville, Jefferson County Infirmary, and Newcomerstown; July 15, Chicago Junction; July 31, Urbana; August 3, Sandusky, Soldiers' Home; August 5, Nottingham, sewerage and water supply; and also a nuisance caused by the flushing of cattle cars; and Bulah Park. He also visited North Lewisburg, June 28; Newark, July 3, and Bowling Green, July 20, on account of complaints of a nuisance.

Upon the request of the health officer of Blanchester, the engineer visited that place June 19, to investigate complaints of the bad condition of the public water supply. He reported that the reservoir water was subject to pollution from the wash of the watershed, and when drawn from the bottom was entirely unfit for a public supply, and the cause of a nuisance when used for sprinkling, on account of its offensive odor, due to foul deposits in the bottom of the reservoir, and probably also to microscopical growths. The well water, which had already been advised against by our Board, was found to be more desirable than the reservoir water, though not satisfactory nor safe for a public water supply. The engineer stated that the only way to secure a satisfactory water at all times would be to install and operate a filtration plant in addition to drawing the water from near the surface and keeping the reservoir clean. He also advised that the reservoir be divided into two sections in order to facilitate cleaning. A copy of this report was sent to the health officer and to the secretary of the waterworks, and the latter was urged in a letter to have his company take steps for the early installation of a filter plant.

The secretary of the board of health of North Lewisburg requested the assistance of the State Board of Health in condemning a mill or ice pond in the residence district of the village, which it was alleged became a source of foul odors at certain times and thereby the cause of a nuisance. The engineer visited North Lewisburg June 28 and made a report. A

copy of this report was sent to the secretary of the board of health and he was advised that if the pond was used as a source of domestic ice supply the board should keep a continual watch upon the watershed in order to prevent any pollution reaching the pond. He was also advised that the board of health had full control in the matter and should be able to abate the nuisance.

The board of public service of Newark, through the health officer, Dr. Henry Day, asked the Board's aid in securing the abatement of a nuisance caused by the pollution of a feeder of the Ohio Canal. The engineer visited Newark July 3 and made a report. The matter was brought to the attention of the State Board of Public Works, and a conference of the chief engineer and a member of that Board, the health officer of Newark and your secretary was held. The State Board of Public Works will have a meeting in a few days when, I was assured, the matter would be taken up and that they would do everything possible to abate the nuisance.

Communications were received from the health officers of Center and Webster townships, in the vicinity of Bowling Green, making complaint of the pollution of Poe Ditch and the North Branch of the Portage River by the sewage of Bowling Green. The engineer visited Bowling Green July 20, to investigate conditions and made a report. A copy of the engineer's report was sent to the health officers of Center and Webster townships and the board of public service of Bowling Green. The attention of the latter was called to the fact that sewage purification works should have been built two years ago, and they were notified that this Board would expect some proper action to be taken for the abatement of the nuisance without unnecessary delay. A communication has since been received from the board of public service of Bowling Green stating that they are contemplating the installation of purification works.

Matters previously acted upon by mail should now be confirmed by a *viva voce vote*.

Respectfully submitted,

C. O. PROBST,
Secretary.

OCTOBER MEETING.

A regular meeting of the State Board of Health was held at the office of the secretary, October 25, 1905, at 8 p. m.

There were present Drs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Mr. Hartzell.

Dr. Warner introduced Dr. Chapman as president and he took his seat.

Mr. John Stollberg, president of board of public service of Toledo, Mr. F. I. Consaul, city engineer, Mr. Charles L. Parmelee, consulting engineer, and Mr. John P. Denison, representing the Norwood Engineering Company, of Florence, Mass., appeared before the Board in regard to a new water supply for Toledo.

The matter was referred to executive session.

Mr. A. P. Biddle, mayor, and Mr. Van Rensler, a member of council of Wauseon, appeared before the Board in reference to additional sewerage for that village. A report of the engineer of the Board upon plans for these sewers was read, and the matter was referred to executive session.

Mr. F. I. Consaul, city engineer of Toledo, presented plans for new sewer districts No. 41 and No. 42 for that city, and on motion of Dr. Warner this matter was referred to the president and engineer for investigation and report.

The Board then went into executive session.

On motion of Dr. Miller, seconded by Dr. Warner, it was voted to disapprove the proposed plans for a sewer in the easterly portion of Chestnut Street (Sewer District No. 3), Wauseon, with outlet into a ditch a few feet east of the corporation line. Also to disapprove of the proposed extension of the sewer now discharging into a dry ditch at a point a few hundred feet south of the junction of Leggett and Brunnel streets; and to advise the village authorities that the present method of disposing of the sewage of Wauseon is dangerous to the health of the inhabitants of the village, as well as to persons living along the creek below town, and that plans, satisfactory to the State Board of Health, for a proper system of sewerage for house sewage only, including a provision for sewage purification, should be prepared and that all future sewers should be built in accordance with this plan; and to further advise that the use of the present sewers for domestic sewage should, as fast as practicable, be discontinued and the houses now discharging therein should

be connected to proper domestic sewers leading to purification plant; that the present sewers could be, unobjectionably, continued in use as storm sewers.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

On motion of Dr. Warner, seconded by Dr. Palmer, it was voted to approve the detailed plans and specifications for proposed water filtration plant for the city of Toledo, which plans were submitted by Mr. Charles L. Parmelee, consulting engineer, on October 23, 1905, for the city, provided that the conditions of approval, already given, of the general plans be made a part of this approval, to-wit:

That a laboratory be established at the filtration works and that analyses of the raw and filtered water be made daily, and oftener during the high stages of the river when the character of the raw water is likely to change suddenly; and, that in the operation of the plant a degree of efficiency shall be maintained at all times satisfactory to the State Board of Health; and also to advise that it would be highly desirable to provide, at the earliest time practicable, a greater storage capacity for the filtered water.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The minutes of the last meeting were read and approved.

The secretary presented his quarterly report, and on motion of Dr. Warner it was approved and ordered filed for publication.

It was moved by Dr. Warner and seconded by Dr. Palmer to approve the detailed plans and specifications for the proposed sewage disposal works for Columbus, which plans and specifications were submitted on October 21, 1905, by Mr. H. O. Pond, president of the board of public service; and to notify the city authorities that although the first condition in the Board's letter of approval of the general plans for the proposed Columbus sewage disposal works, dated September 23, 1905, had been complied with, the second condition, relating to the operation and care of the works, would still be in effect.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Miller to approve the detailed plans and specifications of the proposed water purification works of Columbus, submitted by Mr. H. O. Pond, president of the board of public service, June 14, 1905, in accordance with provision (a) in the Board's letter of approval of the general plans for these works, dated February 7, 1905; and to call the attention of the city authorities to the fact that although condition (a) in the Board's letter of approval

of the general plans had been complied with, condition (b), in so far as it related to the operation of the plant, would still be in effect.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Mr. Hartzell to approve the plan submitted by Messrs. Chapin and Knowles, consulting engineers, October 18, 1905, for the proposed arrangement of the filtered water piping for the Bellaire filtration plant, this plan being a revised drawing of the original plan and having been submitted in order to comply with conditions one and two, which were attached to the Board's approval of the plans for the entire filter plant, given September 7, 1905.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Miller to approve the plans for a water purification plant for the city of Bucyrus, as shown on drawings submitted by The Jackson Filter Manufacturing Company, of St. Louis, October 18, 1905, upon the conditions:

First—That the management and operation of the plant, the use of the coagulant, and the method of controlling the rate of filtration be subject at all times to the approval of the State Board of Health; and,

Second—That the clear water reservoir be so protected that no polluted water, either from the surface of the land or from the ground, be allowed to come in contact with the filtered water.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

A report by the engineer upon sewage disposal for the Home of the Ohio Soldiers, Sailors, Marines, Their Wives, Mothers, Widows and Army Nurses, at Madison, was read by the secretary.

On motion of Dr. Crossland the recommendations for a sewage disposal plant for this home were approved.

On motion of Dr. Stanton, seconded by Dr. Warner, the plans for a proposed storm water sewer in McGregor Street, Elmwood Place, to discharge into Mill Creek, as shown on drawings submitted October 16, 1905, by Mr. H. Tozzer, village engineer, were approved, provided that no domestic sewage be allowed to discharge into this sewer.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Miller that the Board approve the plans for a proposed sewerage system for Monroeville, as shown upon drawings submitted to the Board on February 21, 1905, by Mr. R. J. Wood, consulting engineer, provided:

First—That the main sewer outlet be extended, by means of iron pipe, well out into the current and discharged below the level of the lowest stage of the river.

Second—That the village of Monroeville obtain control of land adjacent to the river below the proposed site for the outlet for use for sewage disposal purposes.

Third—That plans for sewage disposal plant be prepared and submitted to and approved by the State Board of Health before any of the proposed sewers are built; and,

Fourth—That such sewage purification plant, after having been approved by the State Board of Health, be constructed whenever the number of persons using the proposed sewers amounts to two hundred or more; or at such time as may be found necessary by said Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

The secretary presented a report of an investigation made by the engineer, upon request of the local board of health of Hiram, of a nuisance occasioned by improper discharge of sewage at that place. The recommendations of the report were approved.

The secretary reviewed at some length the work of the engineer's office and stated that there was considerable work in connection with that office which could not now be carried on from lack of proper assistance. He laid especial stress upon the fact that it was impossible now to inspect work being done in the construction of waterworks and sewerage systems to gain assurance that the plans for such works, as approved by the Board, were being carried out. He recommended that an assistant engineer be employed.

On motion of Dr. Stanton, seconded by Mr. Hartzell, the secretary was authorized to employ an assistant engineer.

On motion of Dr. Stanton, arrangements for a general meeting with local boards of health were left to the president and secretary.

On motion of Dr. Warner, seconded by Dr. Crossland, the president and secretary were authorized to select for this meeting one or more speakers from abroad and to pay their expenses in attending the meeting.

Matters previously acted upon by mail, were taken up for confirmation as follows:

It was moved by Dr. Miller and seconded by Dr. Palmer to confirm the Board's action approving the plans for proposed mechanical filtration plant for the purification of the water supply of Bellaire, as shown upon drawings and described in specifications submitted to the Board on August 29, 1905, by Messrs. Chapin and Knowles, consulting engineers, provided:

First, That the valves controlling the filtered water be so placed that they will not be submerged beneath the raw water.

Second—That provision be made for wasting the flow of filtered water from any individual filter.

Third—That devices for preventing a rate of filtration greater than 125,000,000 gallons per acre per day be installed at the filtered water outlet of each filter.

Fourth—That revised plans incorporating the above features and showing the plant as it will be actually built be submitted to the State Board of Health; and,

Fifth—That any change in the management and operation of the plant or in the use of the coagulant be made when requested by the State Board of Health.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Miller to confirm the action of the Board approving plans of the proposed coagulation basins, clear water reservoir and general features of mechanical filters for Cincinnati, as shown upon drawings submitted to the State Board of Health on September 6, 1905, by Mr. G. H. Benzenberg, acting chief engineer of the board of trustees "commissioners of waterworks" and as described in the accompanying specifications provided:

First—That the operation and care of the completed plant be subject to the approval of the State Board of Health at all times, and that any changes in the method of operation or in the use of the coagulant be made when requested by the State Board of Health.

Second—That plans and specifications describing the chemical tanks, the apparatus for introducing the coagulant, the controllers and other special devices, and also the character of the filter sand and gravel, be submitted to the Board for its approval, as soon as completed; and,

Third—That a description of the proposed methods of operation, relating especially to the kind and amount of coagulant to be used, be submitted to the Board as soon as decided upon.

Also to confirm the Board's approval of the specifications describing the proposed filter sand and gravel for use in the water filtration plant of the city of Cincinnati, submitted by Mr. G. H. Benzenberg, acting chief engineer, board of trustees "commissioners of waterworks" September 22, 1905.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Warner and seconded by Dr. Stanton to confirm the Board's action approving plans for proposed sewage disposal works for the city of Columbus, as shown on drawings submitted to the State Board of Health on August 18, 1905, and as described in the accompanying application from the board of public service and in subsequent

communications from the chief engineer and the consulting engineer, provided:

First—That detailed drawings of the plans already submitted be presented to the Board as soon as completed and receive its approval; and,

Second—That the operation and care of the works be subject to the approval of the State Board of Health at all times; and that any changes in the method of disposing of the sludge from the septic tanks be made when requested by the Board.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Miller to confirm the Board's approval of the proposed amendment to the plans for water supply and water filtration for Newark, that is, that both the intake and the filtration plant be located below the Newark Water Company's present works, upon land to be owned by the city, adjacent to the west bank of the North Fork of the Licking River and about 3,000 feet north of the northerly corporation line of the city, instead of above the Newark Water Company's works as first proposed.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Crossland and seconded by Mr. Hartzell to confirm the Board's approval of the use of the 12-inch drain, which extends from the Capital University to Alum Creek at a point about 900 feet south of Main Street, for a domestic sewer; provided that the trustees of the Capital University file with the State Board of Health a statement, agreeing either to install a satisfactory sewage purification plant, or to connect the university sewer with the Columbus sewerage system, whenever in the opinion of the State Board of Health it becomes necessary to discontinue the discharge of sewage from the university into Alum Creek. (This agreement was filed Oct. 24, 1905.)

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Miller and seconded by Dr. Stanton to confirm the Board's approval of filtering material for the sewage purification plant at Marion as follows:

First—Hard broken limestone, consisting of pieces of approximately one-half to one and one-half inches in diameter, for use in the contact beds.

Second—Fine limestone screenings, represented by a sample submitted to the State Board of Health on October 7, 1905, and having an effective size of about .85 mm. and a uniformity coefficient of about 6.0, for use in the lower or main portion of the final or sand filters; and,

Third—Lake sand of a grade known as "Mason sand" and as represented by samples submitted on October 10, 1905, having an effective size

of about .35 mm. and a uniformity coefficient of about 3.5, for use in the upper portion of the final or sand filters.

Those voting the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Palmer to confirm the Board's action approving plans for proposed sewerage and sewage purification for the city of Urbana, as submitted by Messrs. Young, Fardwell and Hooke, consulting engineers, on July 31, 1905, subject to the following conditions:

First—That the sewage purification works be built before any of the proposed sewers are put into service.

Second—That the size of the sewage purification works be increased when deemed necessary by the State Board of Health.

Third—That the method of operating the sewage disposal works be subject to the approval of the State Board of Health.

Fourth—That the automatic controlling device, and all pipes constituting a part thereof, be enclosed by a suitable building or otherwise carefully protected from freezing.

Fifth—That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Crossland to confirm the Board's action approving the plans for a proposed water supply for the village of Perrysburg, as shown upon drawings submitted to the State Board of Health on September 18, 1905, by The Riggs and Sherman Company, consulting engineers, which plans provide for obtaining water from the gravel stratum in the bottom lands bordering the Maumee River at a point about 1,000 feet distant from the edge of the built-up portion of the village; provided that no source of pollution, which in the opinion of the State Board of Health would affect the quality of the public water supply, be allowed within 500 feet of any point from which water is taken from the ground.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Palmer and seconded by Dr. Miller to confirm the Board's appointment of Dr. W. J. Fletcher as health officer for the village of Chambersburg, for one year, at a salary of \$60 per year; and the reappointment of Dr. O. S. Cox as health officer of Richland Township, Vinton County, for two years, at a salary of \$60 per year.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

It was moved by Dr. Stanton and seconded by Dr. Miller to confirm the action of the Board approving the rules adopted by the health officer of West Carrollton, which were the rules as recommended by the State Board of Health without change.

Those voting in the affirmative were Messrs. Stanton, Chapman, Warner, Palmer, Crossland, Miller and Hartzell.

In the negative, none.

There being no further business, the Board adjourned.

Attest:

C. O. PROBST,
Secretary.

QUARTERLY REPORT OF THE SECRETARY.

October Meeting, 1905.

Mr. President and Members of the Ohio State Board of Health:

GENTLEMEN:—Your secretary begs leave to present the following report:

Since the last meeting 31 cases of smallpox have been reported. So far as known there are at the present time but three cases of smallpox in the state, all in the city of Cincinnati. Only three investigations have been made on account of the disease.

August 19, Dr. Crossland visited Misco, a small village in Bearfield Township, Perry County, where he found four cases of smallpox in one family. He reported that smallpox had existed in the house the year before, and the cases were no doubt due to improper disinfection at that time. He advised the health officer to thoroughly disinfect after recovery of the cases, and since that time no additional cases have been reported.

September 13, Dr. Platter investigated an eruptive disease at Stoutsville, about which there had been a dispute among the local physicians. He pronounced the disease chickenpox, but advised the health authorities to keep the smallpox card upon the house until the eruption had disappeared and the house had been fumigated.

September 14, Dr. Platter visited Ridgeway to determine the possible source of a case of modified smallpox, reported from Marion. He found no smallpox, but four families where there had been cases of impetigo, and three families where the children had been having chickenpox.

YELLOW FEVER.

On September 15, a train arrived in Cincinnati with a number of yellow fever refugees from Lake Providence and Tallulah aboard. The train was met en route by Dr. Lyle, representing the board of health of Cincinnati, and several persons were found on the train with suspicious symptoms of yellow fever. On reaching Cincinnati they, seven in number, were removed to the detention hospital. The addresses of those who were well and who remained in Cincinnati were secured so that they could be kept under observation. On the Saturday following their arrival three presented fairly characteristic symptoms of yellow fever and two others were still on the doubtful list. Dr. Stanton and the secretary attended a meeting of the health authorities, railroad representatives and others interested, on the 16th of September, and it was decided to receive all yellow fever refugees who desired to come to Cincinnati, and to properly care for all victims of the disease who might be taken sick there.

The president, vice-president and secretary attended the meeting of the American Public Health Association, at Boston, and the president

appointed Drs. Stanton, Miller and Crossland a committee to look after yellow fever in their absence. No occasion arose requiring the committee's attention. No cases of the disease occurred among residents of Cincinnati.

Dr. Warner and the secretary held several conferences with Mr. Fuller, consulting engineer, and Mr. Julian Griggs, city engineer of Columbus, in regard to the sewage disposal plant for Columbus.

Dr. Crossland, accompanied by Mr. Stabler, assistant engineer of the U. S. Geological Survey, investigated a nuisance caused by the Elgin Creamery, near Frazeysburg, with a view of devising some means for disposing of the creamery wastes.

The secretary visited Niagara Falls, N. Y., where he read papers before the State Board of Embalming Examiners, and the twenty-fourth annual meeting of the National Funeral Directors' Association. He presented the following rules and regulations governing the embalmer in the preparation of bodies dead of the following diseases, to wit: smallpox, diphtheria, scarlet fever, typhus fever and measles:

1. Except where the room containing the body has been previously disinfected by the health authorities, the embalmer, before entering such room, shall don outer garments of rubber or cloth completely covering the body, and a cap to cover the hair. Upon leaving the room these shall be removed and placed in a bag and wrapped in a sheet or other covering, all of which shall be disinfected by formaldehyde fumigation, or boiling water, as soon thereafter as possible. He shall also, before leaving the house, thoroughly disinfect his hands, giving special attention to the finger nails.

2. All knives, trocars, needles, syringes and other instruments, and all vessels, sponges, gloves, cooling boards, or other thing used in the embalming or preparation of such dead bodies, or taken into the room by the embalmer, shall be properly disinfected before removal from the house.

3. All fluids or other matters removed from such bodies in the process of embalming shall be mixed with an equal quantity of a five per cent. solution of either formalin or carbolic acid before being finally disposed of.

These were adopted and the secretary of the association was instructed to send a copy to each State Board of Health requesting their adoption and enforcement.

The secretary also read papers on the subject of tuberculosis before the Darke County Medical Society, at Greenville, and the Licking County Medical Society, at Buckeye Lake.

The bacteriologist visited Batavia and Upper Sandusky to inspect their filters; and Scottown to investigate an outbreak of typhoid fever.

Scottown is a small village located in a narrow valley between Big and Little Guyan creeks, just above their union, and is underlaid with a deposit of quicksand from which the wells draw their water. Samples of water from a number of the wells were examined in our laboratory and the results indicated marked evidence of pollution. Investigation showed

that there had been some twenty-five cases of the fever with three deaths, and that the three probable factors responsible for the epidemic were, the polluted drinking water, insufficient disinfection and the carrying of the germs of typhoid material by flies, the opportunities for the latter being great on account of the privies being near the houses and the absence of screens in the houses.

A copy of the report of the bacteriologist was sent to the local health authorities and they were advised to take the greatest precaution to prevent further infection, and to secure a drinking water from the foot of the hill, so located as to be free from any possible infection from adjacent property.

The engineer visited Girard, Gloucester and Perrysburg, in regard to water supply; Wauseon in regard to sewers; Madison in regard to sewerage for the Home of the Ohio Soldiers, Sailors, Marines, Their Wives, Mothers, Widows and Army Nurses; Hiram in regard to a nuisance, and Cleveland to consult Mr. Robert Hoffman, the consulting engineer, in regard to sewerage for a portion of Bedford; and the engineering department in regard to sewerage for the Cleveland City Farm, located at Warrensville.

The health officer of Nottingham requested the Board to investigate the sanitary condition of Beachland, a small private summer resort, or settlement, located upon the shore of Lake Erie within the limits of Nottingham and not far from the city of Cleveland. The engineer visited Nottingham and made a report, a copy of which was sent to the superintendent of Beachland.

The health department of Dayton requested the Board to make an investigation to determine, if possible, the possible pollution of the city's water supply from the Winchett Fertilizer Company's plant and from the city garbage reduction plant.

The engineer visited Dayton on October 12th and made a report, the findings of which were sent to the health officer of Dayton.

The health officer of Delaware asked for an examination of the public water supply, stating that they had some twelve or more cases of typhoid fever and the people were becoming anxious about the water supply. I had the engineer go to Delaware on October 16th to inspect the supply. The water is from wells, which apparently are not liable to be contaminated, but their yield is occasionally insufficient, and at such times the Olentangy River is drawn from for the deficiency. However, there was no evidence that this was the cause of the cases of typhoid. An additional standpipe is being constructed, and with this extra storage the use of river water will, at least for the present, not be necessary.

It will be remembered that at the last meeting Dr. Warner reported upon a nuisance at Delaware caused by the fire-proofing company. A letter has been received from the health officer of Delaware stating that

the company has consented to raise the chimneys of its plant ten feet, which it is hoped will abate the nuisance.

The council of the village of Somerville, after repeated requests to act in the matter, failed to appoint a health officer, Mr. Chapin, the health officer, having been appointed June 7, 1904, for one year. The council ignored all communications from this Board and on September 5, the State Board appointed Dr. J. L. McHenry health officer of Somerville for one year.

After notifying Dr. McHenry of his appointment, council wrote the Board that under the provisions of the municipal code, the term of Mr. Chapin would not expire until January, 1906. The question was referred to the Attorney-General for an opinion, and he held that the term of office of all officers appointed under the provisions of the municipal code was extended by the amendment of the last legislature until January, 1906. The council of Somerville was therefore notified that their former health officer, Mr. Chapin, would hold office until January, 1906, and that the appointment of Dr. McHenry by the State Board of Health was void.

The Attorney General was then asked for an opinion as to how this would affect all health officers appointed by council and he replied that under the Chapman law (97 O. L., p. 39, section 223) the term of a health officer, appointed in lieu of a board of health, must expire on the first Monday in January of any year, and his successor must be appointed not earlier than the second Monday in January and not later than the first Monday in February of that year.

A letter was addressed to the council of each village that had appointed a health officer in lieu of a board of health, quoting this opinion and stating just when their health officer's term would expire.

Matters acted upon by mail since the last meeting should now be confirmed.

Respectfully submitted,

C. O. PROBST,

Secretary.

PUBLIC WATER SUPPLIES

REPORT ON PROPOSED WATER SUPPLY FOR ARCANUM.

June 6, 1905, Dr. W. A. Jones, a member and clerk of the board of trustees of public affairs of Arcanum, submitted to the State Board of Health a sample of water accompanied by the proper affidavit and description of location of source, etc., with the request that the well and location from which the sample of water came be approved by the State Board of Health as a source of public water supply for Arcanum.

In anticipation of this application, the engineer visited Arcanum April 13, 1905, and the following report was made:

Arcanum is a village of 1,300 population, located in Darke County. Painter Creek, a tributary of the Great Miami River, flows within a mile of the center of the village and receives a certain amount of drainage from it through tile drains and open ditches, though the topography of this vicinity is very flat.

The village has no public water supply at present and the inhabitants obtain their water entirely from private wells sunk in the gravel. Cess-pools are located in the same strata.

As a result of the investigations of the engineer of the State Board of Health on April 13, 1905 (before any definite site had been chosen by the village), at which time samples of water from two existing wells were examined, the authorities were informally advised that the land either "immediately east of the D. & U. R. R. and about 1,000 feet south of the Big Four R. R." or a tract "five hundred to 1,000 feet north of the built-up portion of the village" would probably furnish an unpolluted and safe water supply.

Accordingly a test well was sunk in the above mentioned tract north of the village, but it was found that the available quantity of water was too small. Then another well, the one which is now submitted to the Board for its consideration, south of the village, was sunk.

This test well is 800 feet south of the Big Four R. R. and about 100 feet east of the D. & U. R. R. The well consists of an 8-inch pipe, driven through 17 feet of clay, 12 feet of gravel and 30 feet of rock, making a total depth of 59 feet. The water rises to within five feet of the surface. Pumping at the rate of 100 to 300 gallons per minute, for 18 hours, failed to lower the water more than 14 feet.

The pumping station will be located near the location of the present test well and a lot one-half acre to one acre in extent, will be purchased at this point. In addition, water-rights will be obtained by lease on a large tract of uninhabited land adjoining the above mentioned lot on the southeast. The location which will be owned or controlled is removed, approximately, 1,000 feet from the built-up portion of the village. There is one house and one tobacco factory, however, within 400 feet; but with the favorable geological formation these need not be considered dangerous.

The quality of the water is quite satisfactory, though it contains more or less iron. On this account it would probably be more desirable to provide a standpipe or open reservoir instead of supplying water to consumers by compressed air system, as is being considered. (For analyses see laboratory report on water supplies.)

This report was presented to the Board at a meeting held June 14, 1905, and the land situated immediately east of the D. & U. R. R. and approximately 1,000 feet south of the Big Four R. R. near its junction with the D. and U. R. R. was approved, as a location for wells from which to derive a public water supply for the village of Arcanum, provided that the land within 300 feet of any well be owned or controlled by the village and that no source of pollution, which in the opinion of the State Board of Health would affect the public water supply, be allowed within 300 feet of any well.

REPORT ON PROPOSED WATER FILTRATION FOR BELLAIRE.

On August 29, 1905, Mr. L. E. Chapin, representing Chapin and Knowles, consulting engineers for Bellaire, submitted plans and specifications for the filtration of the water supply for that city. These plans were examined by the engineer of the Board and the following report was made:

Bellaire is a city of about 12,500 inhabitants, located on the Ohio River, in Belmont County. The waterworks at Bellaire are owned by the city and have been in use since 1872; the water being taken directly from the Ohio River and pumped into a brick reservoir, having a capacity of 1,500,000 gallons, from which it is distributed to consumers under an average pressure of about 40 pounds per square inch.

About 90 per cent. of the inhabitants use the water for some purpose, while 80 per cent. use it for all purposes, including drinking and cooking. There are over seventeen miles of mains and 2,300 services.

The Ohio River water at Bellaire, aside from being most of the time of a very unsatisfactory quality from a physical standpoint, is polluted by the sewage of four cities, representing a population of some 70,000 people located upon the Ohio River above Bellaire within five miles of the water supply intake. The sewage from a portion of Bellaire itself affords a source of pollution. The entire watershed above Bellaire contains an urban population of 1,500,000.

It is proposed to install, near the present pumping station, a mechanical filtration plant of modern concrete construction and with a normal capacity of 4,000,000 gallons per day. Provision is made for using either sulphate of alumina or sulphate of iron (and lime) as a coagulant.

The river water will enter a sedimentation basin 42 by 94 feet, having a total depth of 33 feet. The capacity is 600,000 gallons, or about six and two-thirds hours flow, upon a 4,000,000 gallon basis.

The apparatus for mixing and introducing the coagulant is located over one end of this basin and pipes are so arranged that the coagulant may be introduced into the water at any of several points during the passage of the water through the basin. The proper point for introducing the coagulant will vary according to the character of the raw water and will be determined for different conditions by experiment.

From the sedimentation basin the water overflows and passes through a canal nine feet wide and six feet nine inches high, located between two rows of filters and over the center of the clear water basin. This canal acts also as a pipe gallery. The filters are eight in number, four on each side of the distributing canal. Each is 19 by 13 feet and has a total area of 1,976 square feet, or .045 of an acre.

From the raw water canal the water is distributed over the surface of the filtering material by means of two sheet steel troughs passing longitudinally over the filter, each being located about three feet from the side walls.

The filtering material is to consist of twelve inches of graded gravel, the particles being clean and rounded and ranging from one-sixth to five-eighths of an inch in diameter. Over this is to be placed three feet of sand which shall be free from dirt and of size to comply with these requirements:

Effective size, from .35 to .55 mm.

Uniformity coefficient, from 1.5 to 1.7, and the proposed average size must be stated in the bid.

This sand may or may not be hydraulically graded, but if so, this fact (must be) stated in the proposal."

The strainer system, which is placed in the lower layer of gravel and collects the filtered water, is designed especially for this plant by the consulting engineers. It consists of a cast iron manifold, semi-circular in section, extending longitudinally along the center of the bottom of each filter. The upper end of this manifold is five inches in diameter, while the lower end is ten inches. Entering the manifold at seventy-six different points are the "strainer pipes." These are 1.25 inch heavy wrought iron pipe, placed in the gravel in parallel rows six inches apart, perpendicular to the manifold. In each strainer pipe are inserted eleven small brass strainers or sieves, each having 37 holes one thirty-second of an inch in diameter. The water, after passing downward through the filtering material, enters these strainers.

A ten-inch pipe receives the filtered water from the lower end of the manifold and conveys it to the filtered water basin. On its way to this basin the ten-inch pipe passes through the bottom of the raw water canal

and the valve controlling the flow of filtered water is located in the canal where it will be submerged under three or four feet of polluted water. If this valve should leak, polluted water would enter the filtered water basin.

As the nominal capacity of the plant is 4,000,000 gallons per day, the rate of filtration will be 88,200,000 gallons per acre per day. This is liberal, for mechanical filtration, and will enable the plant to be shut down for several hours each day, if necessary, without filtering at an excessive rate during the remainder of the time. It is intended to operate the plant continuously during the twenty-four hours, however.

The clear water basin which occupies the space under the filters and canal is 53 by 59 feet, with a total depth of 15 feet and a capacity of 280,000 gallons. Additional storage capacity for 1,500,000 gallons will be obtained in the present reservoir mentioned above.

It has been the special aim of the consulting engineers to design a plant which will cost as little as possible, consistent with good results, and which will be independent of any patented devices. In order to accomplish this, certain features which have been considered, by filter companies as well as by independent authorities, as essential to obtaining the best water, have been eliminated or modified. No guarantee is to be asked for from any filter company or contractor; but by careful planning and inspection it is expected that the finished plant will be capable of producing, with proper operation, the best results. It is stated that expert management will be furnished "as required by the State Board of Health."

One of the features wherein the design of this plant is different from most mechanical filters built in the past is that the raw water after being coagulated is distributed to the filters through an open canal, in which canal is laid most of the piping system. The valves controlling the filtered water as well as the wash water are thus submerged beneath several feet of raw water. In this arrangement the possibility of the raw water gaining access to the filtered water pipes through the valve stems suggests itself. Should this occur, it would not be easy to detect it. It would seem more desirable, therefore, that the valves controlling the filtered water be placed in a position where there would be no possibility of leakage of polluted water into them and where they could be easily inspected if necessary.

Another possible objection to this feature of the design is that leakage of raw water through the concrete bottom of the canal, or rather through the joints which this concrete bottom makes with the main walls, would be possible unless great care is taken in the construction of this bottom. The actual thickness necessary, on account of the weight to be sustained, might not be great enough to insure making a water-tight bottom and eliminating all possibility of any raw water passing through it.

Another point wherein a change is made from the usual custom is

that provision for wasting the filtered water when necessary, by means of a so-called "rewash" valve, has not been made. In the opinion of the designing engineers the first water which passes through the filter is as well purified as that coming later. Authorities in the past have, however, considered such provision as being a necessary adjunct to a filter plant although in actual practice these "rewash" valves are not always regularly used. Even if their use is not always necessary when the plant is running satisfactorily, it seems that rewash valves should be provided if for no other reason than to permit of testing each individual filter, if necessary to improve the efficiency of the plant, without endangering the character of the entire output.

The consulting engineers in their letter of application ask permission of the State Board of Health to omit the use of the rate controllers (which is usually a patented device made by filter companies) usually placed at the ends of the filtered water pipes leading from each filter, and substitute therefor an orifice device which will prevent an excessive rate of filtration. There appears to be no reason why a device based upon the discharge through an orifice could not be made quite as efficient as the ordinary "rate controller," provided such device were properly connected to the filters and placed to the proper elevation. No definite plans showing any rate controlling devices are included in the drawings submitted, however.

The Board, on September 7, 1905, approved these plans for a proposed mechanical filtration plant for the purification of the water supply for the city of Bellaire; provided,

First—That the valves controlling the filtered water be so placed that they will not be submerged beneath the raw water.

Second—That provision be made for wasting the flow of filtered water from any individual filter.

Third—That devices for preventing a rate of filtration greater than 125,000,000 gallons per acre per day be installed at the filtered water outlet of each filter.

Fourth—That revised plans incorporating the above features and showing the plant as it will be actually built be submitted to the State Board of Health.

Fifth—That any changes in the management and operation of the plant or in the use of the coagulant be made when requested by the State Board of Health.

The attention of the consulting engineers was called to the importance of securing the best workmanship in the construction of the canal floors and the filter floors so as to eliminate all possibility of the entrance of unpurified water into the clear water reservoir.

October 18, 1905, the consulting engineers, Chapin and Knowles, submitted a plan entitled "Revised Drawing of Filter Piping and Connections," in order to comply with conditions first and second quoted above.

These plans were referred to the engineer of the Board who reported as follows:

The Board imposed condition number one in its approval of plans for a mechanical filtration plant for Bellaire because the original design of the plant necessitated the placing of the filter piping in the bottom of the raw water canal in such a manner that the valves controlling the filtered water would have to be submerged beneath the polluted raw water, with danger of the leakage of raw water, through the valve packing, into the filtered water. This arrangement has now been corrected by placing the wash water pipes (which contain filtered water) above the level of the raw water in the canal and by enclosing all valves controlling the effluent from the filters within a cast iron barrel. This arrangement permits of gaining access to the valves at any time and repacking or repairing them without danger of admitting polluted water and without the necessity of shutting down the plant.

The second condition was imposed by the Board because the original plans did not permit any of the filtered water to be wasted in case it was found that this water was not being sufficiently purified or in case it was desired to drain the filters for other reasons. This feature has been corrected in the revised plans so that the water from each individual filter can be wasted if necessary.

In regard to the third condition, the consulting engineers state that the drawings for the devices therein mentioned are now being prepared; but that it is necessary to obtain the approval of the Board with reference to fulfilling the first two conditions before definite plans for covering the third condition can be made.

This report and the revised drawings of the original plan, showing the proposed arrangement of filtered water piping, were considered by the Board at its meeting held October 25, 1905, and the plans were approved.

REPORT ON PROPOSED WATER FILTRATION FOR BUCYRUS.

On May 4, 1904, Dr. A. H. McCrory, the health officer of Bucyrus, following the instructions of the local board of health, called the attention of the State Board of Health to the turbid condition of the public water supply, stating that the general complaint was that the water was too dirty to take a bath in. At the same time a letter was received from Dr. J. Bland, bitterly complaining of the condition of the public water supply.

On January 21, 1905, the engineer visited Bucyrus and the following report was made.

The population of Bucyrus is 7,000. The water supply is obtained from a small tributary of the Sandusky River, impounded. The reservoir thus formed is located two or three miles northeast of the city. The water flows by gravity from the reservoir to a pumping station located in the city, from which it is forced into the distributing system. The capacity of the reservoir is about 150,000,000 gallons, which is said to be six months supply for the city. The drainage area, according to the statement of the water company in 1900, is about 2,500 acres, or a little over four square miles, and is inhabited by some 250 persons. The houses in which these people live are ordinary farm houses with the usual privies and other sanitary arrangements. It is not known that any privies are located directly over any of the feeders of the reservoir.

Six public roads cross the watershed and the drainage from nearly all of these enters the reservoir. In one case, at least, steps have been taken to divert the drainage from houses and yards in the opposite direction.

A large portion of the watershed is used for farming, and the wash from cultivated fields following heavy rains, and also possibly from barnyard drainage, may reach the reservoir at times.

As to the question of sewage or house drainage entering the water supply, this is not likely; at least with ordinary care on the part of the occupants of the houses and with occasional inspection by the water company.

The watershed is, however, open to accidental pollution from excreta which might be deposited in the fields or along the roads which cross the watershed.

The supply depends entirely upon the runoff from the watershed during heavy rains; the impounded stream being simply of an intermittent character.

This supply is owned and controlled by the Bucyrus Development Company, and was built in 1900. Plans for its construction and use as a source of water supply were approved by the Board at that time, provided "that the water be purified in a manner satisfactory to the State Board of Health whenever in the opinion of that Board such purification should become necessary."

At the time of the Board's approval in 1900 there was no way of telling definitely just what the quality of the water would be, as the reservoir was not then built and the water in the stream would not indicate the character of the water in the reservoir. Furthermore, there very likely was no water in the stream at that time from which to collect a sample.

From all available information, it appears that the water as now supplied to the city is extremely muddy at times and on this account unfit for domestic use. It is said that the effect of a rain is quickly shown by the turbidity of the water in the pipes. This would indicate that the contents of the reservoir at such times are not great enough to equalize

the character of the water flowing out of it and that the wash from the watershed may enter the mains without much sedimentation.

At the time of collecting the sample there had been no rain for about a week and it is said that the sample represents a much better condition of the water than during periods following heavy rains. (For analyses of water see laboratory report on water supplies.)

The superintendent of the water company states that water is supplied to 641 buildings, classified as follows:

Water supplied to residences	481
Water supplied to business houses	127
Water supplied to hotels	5
Water supplied to schools	3
Water supplied to churches	7
Water supplied to shops and factories	14
Water supplied to railroads	3
Water supplied to fair grounds	1
Total	641

The occupants of these buildings represent one-third to one-half the entire population of the city. The superintendent also states that water for residences is used principally for baths, closets and sprinkling, and for schools for sprinkling and closets only; for business places for general purposes. Shops, factories and railroads use it for steam boilers.

Though used principally for baths, closets and sprinkling, the water is accessible to the occupants of most of the buildings supplied for all purposes, including cooking; and it is stated by some that it is used for drinking, at least when not too muddy.

It would seem that a city the size of Bucyrus should have a public water supply which could be used by every one for all purposes, as it is doubtful whether the use of private wells in a so thickly settled district is safe.

CONCLUSIONS.

1. The danger of pollution to the water supply by sewage containing disease producing germs is slight, at present.

2. The physical characteristics of the water, at times, render it unfit for domestic purposes.

3. The city of Bucyrus, with a population of 7,000, should have a public water supply which can be used by every one for all purposes, and should not be forced to depend upon the use of private wells, which are likely to become contaminated.

4. Proper filtration will render the water satisfactory and safe for all purposes, and a filter plant of a design satisfactory to the State Board of Health should be installed in the near future.

This report was referred to the Board at its meeting held January 26, 1905, and it was voted to require the Bucyrus Development Company (the company owning and operating the waterworks) to install a water purification plant, of a design satisfactory to the State Board of Health, within six months from February 1, 1905.

The Bucyrus Development Company soon after this took steps toward installing a filtration plant, and in July or August signed a contract with the Jackson Filter Manufacturing Company, of St. Louis, to furnish such a plant.

October 18, 1905, this company submitted plans to the Board for its approval. The plant had not yet been installed although most of the shop work had been done upon it.

These plans were examined by the engineer and reported upon as follows:

The plans provide for a mechanical filtration plant, comprising two 15-foot circular wooden filters of 500,000 gallons capacity each, making a total capacity of the plant of 1,000,000 gallons per day. It is expected that alum will be used as a coagulant.

The filter plant will be located near the present pumping station and the water will be conveyed by gravity to the plant from the present impounding reservoir, two or three miles northeast of the city, through the present conduit.

The water will first enter a sedimentation and coagulation basin consisting of a circular wooden tank, 24 feet in diameter and 16 feet deep. This tank is provided with a system of baffle boards so that the coagulant will be thoroughly mixed with the water and so that the tank capacity will be utilized in the most efficient manner. The coagulant, which will undoubtedly be alum, is to be forced into the water at its entrance to the tank by means of a coagulant pump. The tanks for mixing the coagulant are not shown upon the drawings, but it is stated that these tanks will be of the usual design for obtaining a saturated solution of the alum. The coagulant pump is to be connected to the main pump so that the quantity of applied alum will be proportional to the water consumption. The period of coagulation, when the plant is working at the rate of 1,000,000 gallons per day, will be about one and one-half hours. This will doubtless be sufficient, as the water is subjected to prolonged sedimentation in the impounding reservoir before it reaches the filter plant.

The coagulated water will flow by gravity to one or both of the two 15-foot filter tanks and will be distributed on to the filtering material by means of gutters around the inside walls and just above the sand.

The filtering material is to consist of 3 feet of "Red Wing" sand, having an effective size of about .30 mm., under which will be six inches of fine quartz gravel. The strainer system for collecting the

filtered water from the lower stratum of filtering material is of the standard design of the Jackson Filter Manufacturing Company and is a patented device. It consists, in brief, of a large number of 2-foot lengths of brass pipe, $1\frac{1}{2}$ inches in diameter, the lower halves of which are imbedded in concrete and the upper halves perforated with narrow slits to admit the water. These pieces of brass pipe connect with a "manifold" which in turn conveys the filtered water to the main effluent outlet.

For controlling the rate of filtration through the filters there will be provided a fixed orifice or nozzle of such size that the filter cannot operate at any time at a rate greater than 125,000,000 gallons per acre per day. This method of control is different from the usual practice employing an adjustable "controller" which probably produces a more even rate of filtration than the fixed nozzle, as the filter becomes dirty. The proposed method makes it impossible, however, without tearing out a large amount of piping, to overwork the filters. Such an arrangement is therefore a distinct advantage. On the other hand, with the method proposed, the rate of filtration may decrease considerably between the time when the filter has just been washed and the time when it is dirty.

A system of rakes or teeth is provided for agitating the sand when it is being washed. This system is similar to many in use although the manufacturers claim that less power is required to operate it than is required for any other.

For washing the filter the necessary piping and valves are provided so that the filtered water can be forced backward through the strainer system and filtering material and overflow into the distributing gutter and thence to the sewer.

The filtered water will be collected in the present covered reservoir which was built some twenty years ago for a filtration well, but was abandoned for this purpose on account of lack of ground water. This reservoir is 50 feet in diameter, 30 feet deep and holds about 480,000 gallons, or nearly a day's supply. It is proposed to build a brick wall around the inside of this reservoir in order to avoid any possibility of the entrance of surface water. It is not known to what extent the ground water leaks into this reservoir.

From here, the present main pumps will force the water directly into the distributing system. There is no standpipe or distributing reservoir so that it is necessary to operate the pumps night and day.

The plans as submitted provide for a plant which, with proper operation, will undoubtedly purify the Bucyrus water in a very satisfactory manner. The water is probably not now badly polluted, but is objectionable largely on account of its physical characteristics. The capacity of the plant, 1,000,000 gallons per day, is quite sufficient to provide for the expected increase in consumption for several years hence, as the present consumption is not more than one-half million gallons

per day and the population of the city is but 7,000, only one-half of which use the water. In its contract with the Bucyrus Development Company, the Jackson Filter Manufacturing Company guarantees that the quality of the water and operation of the plant shall be satisfactory to the State Board of Health. No provision has yet been made for continuous expert management of the plant, nor for daily analyses of the water, but the superintendent of waterworks will be fully instructed by competent persons as to the operation of the plant.

This report was presented to the Board at its meeting held October 25, 1905, and the plans for a water filtration plant for the city of Bucyrus, as shown on drawings submitted to the State Board of Health on October 18, 1905, by the Jackson Filter Manufacturing Company, were approved, provided:

First—That the management and operation of the plant, the use of a coagulant, and the method of controlling the rate of filtration be subject at all times to the approval of the State Board of Health; and,

Second—That the clear water reservoir be so protected that no polluted water, either from the surface of the land or from the ground, be allowed to come in contact with the filtered water.

REPORT ON PROPOSED WATER FILTRATION FOR CINCINNATI.

On September 5, 1905, plans and specifications for the most essential portions of a proposed mechanical filtration plant for the city of Cincinnati, were submitted to the State Board of Health, for its approval, by Mr. G. H. Benzenberg, acting chief engineer of the board of trustees, "commissioners of waterworks." The plans and specifications were examined by the engineer of the Board and the following report was made:

HISTORICAL NOTES.

The first public waterworks were installed in Cincinnati in 1820, by a private company operating under a 99-year franchise. The plant changed hands several times and was finally sold to the city in 1839 for the sum of \$300,000. The works at that time consisted of a pump house, two pumping engines, a reservoir, nineteen miles of wooden pipe and three and one-half miles of iron pipe. The source of supply was the Ohio River.

As the city grew, sewage and other refuse was discharged in increasing amounts into the river above the waterworks intake and the

quality of the water, rarely satisfactory on account of its physical appearance, was rendered unsafe and less desirable than ever. The works were made more unsatisfactory by the fact that the capacity of the pumping machinery and water mains was not increased in proportion to the demand for water. Accordingly, in 1896, a commission of three engineers was appointed to report upon a new source of supply and a new waterworks system. One of the recommendations of this commission was that the Ohio River water be used, after plain sedimentation and purification by slow sand filtration. The report of the commission was adopted by the city and a special board of waterworks trustees was created. The trustees in 1897 appointed a board of five expert engineers and submitted to them the plans drawn by the above mentioned engineer commission of 1896. The board of expert engineers recommended further investigations as to means for improving the appearance and quality of the water, and suggested mechanical filtration as being worth consideration.

GENERAL PLAN FOR NEW WATERWORKS.

The general plan for a new water supply system finally adopted by the board of trustees comprises the following principal features:

First—An intake pier or shaft is sunk into the bottom of the channel of the river near the Kentucky shore, opposite the village of California, Ohio, one mile above the mouth of the Little Miami River and about six and one-half miles above the present pumping station. At this place the water is 20 feet deep at the lowest stage and is quite free from any fresh sewage pollution.

The river water is taken into the pier through one of two openings near the surface of the river (one for high water and one for low water) and after screening through a movable wire screen, drops into a seven foot tunnel 1,426 feet long leading to a point beneath the pump well of the intake pumping station on the Ohio side of the river.

Second—An intake pumping station is located on the Ohio shore, just below the village of California. The pump pit at this station is 98 feet in diameter and the bottom is 85 feet below the ground and 10 feet below low water in the river. A shaft extends from the center of the bottom of the pit downward into the end of the intake tunnel. Through this shaft the water is drawn. There are three or four pumping engines of 30,000,000 gallons capacity each. From this station the water is forced to the settling basins by two lines of 60-inch cast iron pipe.

Third—The treatment of the water will include sedimentation and filtration. There are two settling basins, formed by damming a natural ravine. These two basins will have an available capacity of 345,000,000 gallons. They will be used alternately and the capacity of each is sufficient to allow of over three days' sedimentation with present consump-

tion, and about two days' sedimentation when the capacity of the works is reached. From the sedimentation basins the water will flow by gravity to the filtration plant. The board of trustees did not know, at the time these plans were adopted, what method of filtration would be used; but since that time, as a result of thorough experimental studies, the filter plant has been designed as described below.

Fourth—Leading from the filtration plant to the city pumping station is a tunnel 22,264 feet long. This tunnel, or conduit, is of brick and concrete, 7 feet in diameter and approximately parallel to the Ohio River. Its upper end is 60 feet below low water level. There is a deep shaft leading down to the tunnel at either end.

Fifth—A second new or lower pumping station is located near the center of the city and will contain three vertical triple-expansion engines of 25,000,000 gallons capacity, and three of 12,000,000 gallons capacity. From this station the main supply is to be pumped to the Eden Park reservoir, holding 100,000,000 gallons (the present distributing reservoir) from which the water will flow by gravity to the mains, except in the high service districts where a special line of mains will lead directly from this pumping station.

The estimated cost of carrying out these plans is about \$10,000,000, and the works will have a capacity of 90,000,000 gallons.

These plans were presented to the Board for approval in November, 1897. They were referred to a committee consisting of Drs. Hoover, Stanton and Probst, and were thoroughly investigated. Adopting the recommendations of this committee, the State Board of Health approved these plans in January, 1898, subject to the condition "that the new water supply shall be filtered in a manner satisfactory to the State Board of Health."

PROGRESS OF WORK.

First—*Intake.* The intake pier and tunnel leading to the pump pit at the intake station has been completed.

Second—*Intake Pumping Station.* The pumping machinery, consisting of four 30,000,000 gallons pumping engines, is now being installed at the intake pumping station; though great difficulty was encountered in constructing the pump pit on account of the upward pressure of the ground water beneath the bottom of the pit. As a final remedy, enormous iron castings were installed to counterbalance the upward pressure of the ground water and provide a suitable foundation for the machinery. The force mains, leading to the settling basins, have been laid.

Third—*Purification.* Thorough experimental studies were carried on from March 28, 1898, to July 31, 1899, upon the best method for purifying the Ohio River water at Cincinnati, under its varying conditions. A

report, containing a fuller account, including the results of these experiments, has been published by the board of trustees and a copy has been submitted to the State Board of Health. The final conclusion arrived at, after a thorough analysis of the results, is "that the evidence obtained during these investigations shows that it is practicable to clarify and purify the Ohio River water in a satisfactory manner by either the modified English system (slow sand filtration, preceded by use of coagulant at times) or by the American system (mechanical). Of these two systems, the experience and data indicate clearly that the American system would be the less difficult to operate; would be somewhat cheaper; would give substantially the same satisfactory quality of filtered water; and could be much more readily and cheaply enlarged for future requirement. It is, therefore, considered that the American system of clarification and purification would be the more advantageous to adopt for the local water supply."

No actual work has been done in building the purification system except that the preliminary settling basins of 345,000,000 gallons capacity are now under construction. The plans for filtration are now before the Board for approval.

Fourth—*Tunnel from Filtration Plant to Second Pumping Station.* This tunnel, or conduit, is now completed. The work was accomplished by means of ten headings leading from two permanent and four temporary shafts. Considerable difficulty was encountered in keeping out the ground water, and also the natural gas, during construction. The final work is said to be quite satisfactory.

Fifth—*Second or Lower Pumping Station.* The buildings at this pumping station are about completed, but the machinery has not yet been installed.

PRESENT CONDITIONS.

At present, while awaiting completion of the new water supply system, Cincinnati is taking its water from the old intake near the center of the city and below several sewer outlets. The following facts describe in a general way the condition of the present waterworks:

The estimated population of Cincinnati is 354,000, of which 340,000 use the public water supply for some purpose, while 290,000 use it for drinking and cooking.

The average daily consumption in 1904 was a little over 48,000,000 gallons, or 137 gallons per capita. Deducting the amount used by factories, the average daily consumption, per person using the public water supply, was 124 gallons.

There are 465 miles of mains and 39,000 services in use. Eleven per cent. of the services are metered.

The total cost of the Cincinnati waterworks up to January 1, 1905,

was \$15,689,000. This includes the payment of interest on the bonds issued for the construction of the new waterworks.

There has been a shortage of water during the past year on account of inadequate mains and machinery. Precautions against waste have been taken, but the number of meters installed is small. Warnings to boil the water have been issued at times by the city health department.

PLANS FOR PROPOSED FILTRATION.

The plans submitted do not cover the entire completed filtration plant, as it was deemed advisable, in order to save time, to design the main features and place them under construction as soon as possible, thus leaving plans for certain parts, which would not be affected by the construction of the main portion, to be worked out later.

Accordingly, the plans and specifications submitted provide for the clearing and grubbing, general excavation and grading, concrete work, pipe lines, valves and valve chambers necessary for the construction of first, the coagulation basins; second, the general features of the filters proper, and third, the clear water reservoir. The specifications provide for placing the strainer system, and the system itself is shown on the drawings, although the contract for it is not to be awarded at this time. In a similar manner, the specifications provide for placing the filter sand and gravel, although the character of this material has not yet been decided upon. Those portions of the plans to be determined later are, therefore, the buildings, chemical apparatus and laboratory, size and quality of sand, controller system and other special devices, as well as the methods of operation and the use and kind of coagulant.

The filtration plant, including the coagulation basins and the clear water reservoir, will be located on the high ground adjoining the bottom land of the Ohio River valley, between the Little Miami River and the village of California. This is in the immediate vicinity of the preliminary settling basins and also of the intake pumping station. The area on which the filter tanks are to be located is to be excavated to the proper elevation, after which 28 concrete filter tanks, each about 32 feet by 50 feet in area, are to be constructed upon a concrete groined arch foundation. The nominal capacity of the filtration plant, based on a rate of 125,000,000 gallons per acre per day would be 125,000,000 gallons. This gives a possible yield from each filter of 4,500,000 gallons per day. It is probable that this rate will not be used for many years.

Adjacent to the filters will be two coagulation basins (Numbers 1 and 2) of about 10,000,000 gallons capacity each, and one basin (No. 3) of about 2,000,000 gallons capacity. The clear water reservoir, also adjacent to the filters, will have a capacity of 18,000,000 gallons.

The water from the preliminary settling basins, after two or three days' sedimentation, will be drawn off from points near the surface and

flow by gravity through two 60-inch cast iron pipes to a valve chamber, or head house, from which it will be diverted to the coagulation basins.

Coagulation Basins. These basins will be constructed by excavating the ground to the proper form and then placing a lining of selected clayey material, to be obtained in the immediate vicinity, upon the bottom and sides or inner slopes of these basins. The portion of this lining near the tops of the slopes will be covered by a layer of broken stone. The whole of the bottoms and slopes will be covered by a layer of concrete over which will be placed waterproof coating, of asphalt, and a layer of brick. This will effectually prevent any passage of water in or out of the basins through the bottoms or sides. The basins will be uncovered; but the edge, around the top, will be thoroughly protected against any surface drainage. The inlet conduit from the valve chamber is to be of concrete, while the outlet chambers are to be of steel pipe laid in concrete. A concrete wall is to separate basins No. 1 and No. 2. The following are the dimensions of the basins:

Coagulation basins No. 1 and No. 2, each 200 feet by 400 feet at the top of the side slopes and 150 feet by 320 feet at the bottom. The depth in the center is to be twenty-three and one-half feet. Each of these basins will hold about 10,000,000 gallons.

Coagulation basin No. 3, 80 feet by 400 feet at the top and about 15 feet by 340 feet at the bottom. It will be about 18 feet deep and will hold about 2,000,000 gallons.

The total coagulation period provided, with the works running at full capacity, is six or seven hours. All of the basins are to be provided with 20-inch mud valves through which the sludge may be forced out of the bottoms by water pressure from the pumps.

The water is to enter each of the three coagulation basins at the southerly end and, after flowing in the longitudinal direction through these basins, will be drawn off, near the top, at the northerly end, through seventeen different outlets in basins No. 1 and No. 2; and through six different outlets in basin No. 3. The inlet conduit in basins No. 1 and No. 2 is to be placed near the bottom while the inlet conduit in basin No. 3 is to be at the same elevation as the outlet; that is, about 4 feet from the top.

Plans for the exact method of introducing the coagulant have not yet been decided upon. It is evident, by studying the design of the basins, however, that nearly any period of coagulation which would ever be considered practicable, could be obtained.

Filters. The unit filters are to consist of rectangular re-enforced concrete tanks, 28 in number, each being 32 feet by 50 feet in area and having a total depth of nine feet, thus giving a total combined area of about one acre. These individual filters, as well as the plant as a whole, are larger than any yet built. Each filter will contain two and one-half feet of sand overlying eight inches of graded gravel. The specifications for this sand and gravel have not yet been made.

The filter tanks are arranged in two parallel rows of fourteen each, separated by a wide pipe gallery and operating floor. The area thus covered is 500 feet by 170 feet. Located beneath the filter tanks, and serving as a foundation for them, is a subterranean chamber, six feet high inside, with both bottom and top built in the form of groined arches; the bottom arch being, of course, inverted. The piers separating these arches are twenty-one inches square and spaced eleven feet center to center. This design is new and gives an excellent opportunity for placing the piping beneath the filters where it will be easily accessible.

The main pipe gallery is 28 feet wide and 23 feet deep, extending from the top of the filters (level of operating floor) downward to a point below the bottom of the filter foundation. This gallery will contain all influent, effluent, wash and drain pipes with the necessary valves and controllers. Access to the galleries as well as to the piping beneath the filters may be had with ease. In no case are filtered water pipes submerged beneath the raw water. Intersecting the main pipe gallery at its mid-length is a short cross gallery or middle gallery which provides space through which the main raw water, filtered water and main drain pipes may enter and leave the plant without being placed in inaccessible localities.

The building which is to cover the filters, the laboratory, the boiler house, the filter pumps and the head house, which is to contain the chemical apparatus, and the apparatus itself, have not yet been designed.

The strainer system in each filter consists of an arrangement of long strips of perforated brass plates extending in rows between specially designed concrete ridges covering the entire bottom of the filter. These ridges, and the valleys between them, extend longitudinally the whole length of the filter. The space from center to center of each ridge is one foot, and the furrow, or valley lying between, is 11 inches deep. Three inches above the bottoms of these valleys are shoulders which are designed to receive the above mentioned brass strainer plates. These plates are three and one-half inches wide and are to be manufactured in strips three feet and three-eighths inches long. The joints between them, as they are placed, are to be lapped three-eighths of an inch and made tight with red lead. Each three-foot strip of plate contains 212 holes, three-thirty-seconds of an inch in diameter, placed symmetrically in rows, three-fourths of an inch apart, beginning one-half inch from the edge of the plate. The strainer plates are anchored in place, at intervals of twelve inches, by brass anchor bolts fastened to half-inch brass rods extending into the bottoms of the ridges crosswise the length of the filter.

After the filter gravel, which is to fill the valleys over the strainer plates as far as the tops of the furrows, has been placed, brass wire screens, consisting of about 12 wires per inch each way, of number 20 wire, are to be placed over the top of the gravel and securely fastened to the tops of the ridges.

Between each strainer plate and the extreme bottom of the furrow is a space two and three-fourths inches wide by three inches deep, in which the water is collected after passing through the holes in the plate. At intervals of about seven and one-half feet, following the longitudinal direction of the filter, are openings in the extreme bottom of the furrows, or valleys. Through these openings special four and one-eighth inch pipes, 21 inches long, extend vertically downward, through the bottom of the filter, into a ten-inch pipe, 14 feet long, located in the six-inch space beneath the filter and extending at right angles to the furrows. Each ten-inch pipe has an opening at its center, in the bottom, leading downward into a larger pipe, placed at right angles to it or longitudinally with the filter. These longitudinal pipes gradually increase in size until at their entrance into the main effluent pipe they are 30 inches in diameter. A 60-inch main effluent pipe, extending through the pipe gallery the entire length of the filter plant, receives the discharge from each filter and conveys it to the clear water basin.

To summarize, the water after being settled and coagulated is conveyed through a 60-inch influent pipe running parallel to the rows of filters in the center of the pipe gallery. From this influent pipe the coagulated water is turned onto each filter, as described, and distributed over the surface of the sand through a main longitudinal gutter of special design from which lateral gutters lead out at intervals of nine feet. The water after being thus distributed over the surface, passes downward through the sand and gravel and through the brass strainer plates into the bottom of the furrows beneath. From there it is led downward into the piping system located in the subterranean chamber formed by the special construction of the filter foundation, and also into the pipe gallery.

No system is to be installed for introducing air into the filters, or otherwise agitating the filtering material when washing, as is usually done. In answer to a letter of inquiry as to this omission in plans, Mr. G. H. Benzenberg, acting chief engineer, replied as follows: "Having at our laboratory plant here tried air and water separately and also jointly and water alone under various heads, we have, from our observations, come to the conclusion that water alone under an accelerating pressure up to nine pounds per square inch at the strainer base, effects a more thorough washing of the sand and with less water than with any other system now in use. We have therefore adopted that method of washing the same."

Tests on the filter plant at Little Falls have shown that it is quite possible to operate it without air or mechanical agitation and there seems to be no reason why the bacterial efficiency should be affected by this feature.

The present plans do not provide for any devices for controlling the rate of filtration through the filters. Such controllers, however, are to be designed later.

Clear Water Reservoir. The construction of the clear water reservoir is to be practically the same as that of the coagulation basins except that in the revetment of the bottom no brick is to be used, and a series of inverted groined arches is to be built forming a means of support for a possible future masonry cover. The reservoir is to be 400 feet square at the upper edge of the slope and about 325 feet square at the bottom. Its greatest depth will be 22 feet and it will hold about 18,000,000 gallons. Of course this reservoir is not intended to afford a reserve supply of filtered water for the city, but to act as regulator for supplying filtered water to the pumps at the lower pumping station. The present distributing reservoir at Eden Park, holding 100,000,000 gallons, will still be used.

The 60-inch filtered water main from the filters will lead into a special inlet chamber at the southwesterly corner of the clear water reservoir, where it will flow over a weir and enter an 84-inch inlet conduit, located along the westerly side of the reservoir at about mid-depth. The water is to flow out of this conduit into the reservoir through 36-inch openings spaced 60 feet apart. The water is to be collected by another 84-inch conduit, located in the bottom of the reservoir on the opposite, or easterly side, containing 14 24-inch openings, spaced 18 feet apart. From this outlet conduit the water flows to a shaft through which it drops into the tunnel leading to the lower pumping station.

Capacity and Efficiency of Plant. Based on the usual rate for mechanical filtration, of 125,000,000 gallons per acre per day, the proposed filter plant would have a capacity of about 125,000,000 gallons; which is far in excess of the present or the immediate future needs of the city, and is greater than the nominal capacity of the other features of the new water supply project. It is probable, therefore, that these filters will be operated at a slower rate than that generally used as a basis of design. This would be a decided advantage, as the rate of 125,000,000 gallons per day per acre, though the accepted standard, is probably too great in some cases to give uniformly good results. The design proposed would also have the advantage of allowing the plant to be shut down for considerable periods, if necessary, without filtering at an excessive rate during the remainder of the time. With the present daily consumption of less than 50,000,000 gallons, therefore, very ample area has been provided, as the city has not yet installed water meters to any great extent. It is possible that by the use of meters the water consumption can be kept down for several years even though the population increases rapidly.

The plant proposed seems to be in accordance with the general results obtained by the experimental studies of 1898 and 1899. Based on these studies alum was recommended as the best coagulant, although the possibility of securing another satisfactory coagulant was suggested. This, however, is a point to be decided later.

The experiments pointed to the necessity of providing a coagulant

basis of at least six hours capacity, and of introducing the coagulant at several different points. The plans are in harmony with this.

It was also suggested at the time of the experiments that individual filters of much larger size than were then being used would be desirable. The individual filters now proposed have a capacity of 4,500,000 gallons, which is exceptionally large.

It is expected that the bacterial efficiency will be 98.5 to 99.5 per cent., and that the water will be satisfactorily clarified.

The plant is so designed that all valves, controllers, etc., will be readily accessible for inspection: Also there will be little or no possibility of the filtered water becoming contaminated at the plant.

The Board, on September 20, 1905, approved the plans of the proposed coagulation basins, clear water reservoir and general features of mechanical filters for Cincinnati, as shown upon drawings submitted to the State Board of Health on September 6, 1905, by G. H. Benzenberg, acting chief engineer of the board of trustees "commissioners of water-works," and as described in the accompanying specifications provided:

First—That the operation and care of the completed plant be subject to the approval of the State Board of Health at all times, and that any change in the method of operation or in the use of the coagulant be made when requested by the Board.

Second—That plans and specifications describing the chemical tanks, the apparatus for introducing the coagulant, the controllers and other special devices, and also the character of the filter sand and gravel, be submitted to the Board for its approval, as soon as completed; and,

Third—That a description of the proposed methods of operation, relating especially to the kind and amount of coagulant to be used, be submitted to the Board as soon as decided upon.

FILTERING MATERIAL.

In accordance with the second condition, quoted above, specifications for filtering material for the filtration plant were submitted on September 22, 1905, by G. H. Benzenberg, acting chief engineer, board of trustees "commissioners of water works."

The engineer of the Board reported upon these as follows:

These specifications describe very definitely the size and character of the filter sand and filter gravel which is to be furnished by the contractor.

For the filter sand, bids on alternative propositions are asked. The first proposition calls for "standard filter sand," of such size and quality that it can be placed directly in the filters; and the second (or alternative) proposition, for Ohio River sand of such a character that after washing and screening by the city, this sand will be of the same character as the "standard filter sand." Of course under the second (or alternative) proposition a much larger quantity of sand must be furnished by the contractor in order to allow for waste.

The filter gravel is to be of four different sizes or classes as described by the following:

"The gravel of the various classes shall consist of particles of sizes passing or retained on screens shaken in a horizontal position, said screens having square openings of the following clear dimensions:

	Particles passing screen hav- ing clear openings of	Particles retained on screen hav- ing clear openings of
Class A.....	1 inch	$\frac{1}{2}$ inch
Class B.....	$\frac{1}{2}$ inch	$\frac{1}{4}$ inch
Class C.....	$\frac{1}{4}$ inch	$\frac{1}{8}$ inch
Class D.....	$\frac{1}{8}$ inch	$\frac{1}{16}$ inch

"Gravel of each of the above classes shall not contain an excess or deficiency of particles of a particular size, but shall be uniformly graded between the limits given for that class."

The quality of this gravel is covered by the following clause:

"All filter gravel shall consist of hard, durable, and rounded particles of high specific gravity, free from thin, flat, or long-shaped pieces. Gravel shall be washed clean and free from sand, loam, clay, dirt and organic impurities. When the gravel, without being crushed or ground, is digested for twenty-four hours in cold strong hydrochloric acid, at least ninety-five per cent. shall remain insoluble."

The standard filter sand "shall be composed of particles of the following sizes and grading, all percentages being calculated by weight. The diameters of the sand grains shall be computed as the diameters of spheres of equal volumes. Not more than two-tenths (0.2) per cent. shall be finer than two-tenths (0.2) of a millimeter; not more than two (2) per cent. shall be finer than twenty-five one-hundredths (0.25) of a millimeter; not more than ten (10) per cent. shall be less than thirty-two one-hundredths (0.32) of a millimeter; at least ten (10) per cent. shall be finer than thirty-eight one-hundredths (0.38) of a millimeter; at least ninety (90) per cent. shall be finer than eighty-five one-hundredths (0.85) of a millimeter. The ratio of the size than which sixty (60) per cent. is finer, to the size than which ten (10) per cent. is finer, shall be not more than one and six-tenths (1.6)."

The Ohio River sand, if furnished, shall be "clean sand, dredged in the ordinary manner from the Ohio River, from which all particles coarser than one-quarter of an inch have been removed by screening. The sand shall contain no finer nor coarser particles than those contained in the jar exhibited in the office of the chief engineer and marked 'Ohio

River sand,' and shall closely approximate the sizes of the grains in said jar. The value to the trustees of this sand, as shown by the samples submitted by the bidder, as compared with standard sand and with the samples of Ohio River sand submitted by other bidders, will depend largely upon the amount of material which it will be necessary for the trustees to remove from the sand submitted in order to produce a sand having particles equal in size and grading to the standard sand. A further measure of the comparative value of the sands submitted will be their freedom from clay, coal, dirt, and perishable material."

October 19, 1905, the Board approved the specifications describing the proposed filter sand and gravel for use in the water filtration plant of the city of Cincinnati, submitted September 22, 1905.

REPORT UPON PROPOSED WATER SUPPLY FOR THE OHIO INSTITUTION FOR THE EDUCATION OF THE DEAF AND DUMB, AT COLUMBUS.

On August 10, 1905, Mr. Thomas Cureton, consulting engineer for the Ohio Institution for the Education of the Deaf and Dumb, made application to the Board for approval of a new water supply system and at the same time submitted for analysis a sample of water from a test well. The engineer of the Board visited the institution on August 10th, to make the necessary investigation, and the following report was made:

The Ohio Institution for the Education of the Deaf and Dumb is located in Columbus, on East Town Street, about one-half mile east of the center of the city. The institution grounds cover about ten acres. The water supply for many years has been derived from a well located within the grounds. The upper part of this well is dug to a depth of perhaps 30 feet and in the bottom of the dug well is a ten-inch driven well which pierces the sand and gravel stratum lying at a depth of 50 or 60 feet below the surface. The quantity of water obtained from this well has been sufficient until recently. Past analyses, made by the State Board of Health, have shown it to be a safe water though not entirely satisfactory. Within a few months, however, the supply has suddenly been greatly diminished and it has become necessary to procure water from other sources.

Accordingly, four six-inch wells have been driven, all in the north-western portion of the institution grounds. These wells are from 60 to 70 feet deep and pass through 20 feet of clay and gravel, and 38 feet of blue clay, below which is a stratum of water-bearing sand and gravel. The water stands in the wells at an elevation of 21 feet below the surface.

The district immediately surrounding the institution is thickly built up and it is estimated that from six to eight thousand people live within less than one-half mile of the proposed wells. This district is said to be thoroughly sewered, however, and all houses in the immediate vicinity are required by the city board of health to connect with the sewers. Nevertheless, there is always a certain amount of pollution which comes from thickly populated districts no matter how well sewered; which pollution undoubtedly affects the ground water.

The direction of flow of the ground water is thought to be from the northwest, although with continued pumping the water would probably be drawn to a large extent from all directions.

The analysis of the sample submitted by the consulting engineer and collected from test well No. 4, after three days' pumping, shows the water to be at present safe though possessing undesirable features, among which are its turbid appearance, due to iron, and also its hardness. Organically, the analysis of this sample is worse than any previous analysis of the present supply; which fact would seem to indicate that the ground water beneath the institution was showing some effects of the increasing pollution in this vicinity. (For analysis of this water see laboratory report on water supplies.)

The water is to be pumped from the wells into a receiving basin by means of compressed air; from this basin it is to be raised into the distributing tank in the tower of the main building of the institution.

The reason for desiring to obtain a supply from wells in the institution grounds instead of using the city water is on account of the latter being more expensive. It is even thought that the well water could be purified, if necessary, without making it cost more than the city water. This is probably true, provided the supply of well water does not give out. With the ten acres of ground which may be used as a location for future wells, however, it is quite probable that enough water can be obtained for a considerable time in the future. It is important that some suitable water supply be obtained immediately as the pupils cannot begin their next school year until a supply is provided.

In view of the fact that the location of the proposed wells is highly undesirable, and that the water as shown by the analysis of test well No. 4 contains more organic matter than the ground water in this locality has hitherto contained, and is unsatisfactory on account of its physical characteristics, it would seem that it would be much safer to purify the water before using it.

This report was presented to the State Board of Health at its meeting held August 16, 1905, and it was voted to approve the supply provided the water be purified in a manner satisfactory to the State Board of Health.

REPORT ON PROPOSED WATER PURIFICATION FOR
COLUMBUS.

At a meeting of the Board held January 26, 1905, general plans for the water purification plant for the city of Columbus, providing for both softening and filtering the water, were considered. These plans were referred to a committee, consisting of the president, secretary and engineer, who reported upon them as follows:

The plant is to be located on the east side of the Scioto River just north of the Big Four Railway bridge. The source of supply will be the same as that mainly in use at present by the city; namely, the Scioto River. The raw water will be taken from the river a short distance above the present intake, which is at the up-stream end of the suction conduit leading to the existing West Side Pumping Station.

The purification works will have a nominal capacity of 30,000,000 gallons per 24 hours.

The filters will be ten in number, each filter having a normal capacity of 3,000,000 gallons per 24 hours. The filters will be of concrete construction and in accordance with the most recent practice.

The clear water reservoirs will be two in number and will have a total capacity of about eight hours' supply, or about 10,000,000 gallons.

The plans, while general in character, showed sufficiently well what it was proposed to do, and they were approved February 7, 1905, subject to the provisions:

(a) That detailed plans showing fully the works as they will be after construction, together with a description of operative procedures, so far as these may be determined in advance of operation, be submitted to the Board for approval as soon as practicable.

(b) That laboratories be established, and that daily, and if necessary more frequent, examinations be made of the raw and purified water to determine the degree of softening and purification effected, which shall at all times be satisfactory to the State Board of Health.

It being highly desirable that the water delivered to the filters be as free from pollution as possible, the Board also suggested that proper steps be taken to guard the water flowing from the dam to the intake against sewage or other sources of contamination, and that the next General Assembly be requested to provide for purifying the sewage from the Girls' Industrial School, which discharges its sewage into the Scioto River, the source of the water supply, about 13 miles above the site of the dam.

June 14, 1905, in compliance with provision (a) of the approval given February 7, 1905, Mr. H. O. Pond, president of the board of public service, submitted full detailed plans and specifications of the proposed water purification plant, consisting of eighty-nine drawings and a two-hundred-page volume.

These plans were referred to the engineer of the Board, who reported upon them as follows:

The detailed plans now submitted, in compliance with provision (a), are practically an elaboration of the general plans already approved and contain no new principles. These plans and specifications describe minutely the construction of the settling basins, clear water reservoir, buildings, head house, laboratories, mechanical mixing tanks, pipe gallery, filter controllers, operating stands, gage boards and system for applying compressed air to filters for washing purposes.

The purification works will have a nominal capacity of 30,000,000 gallons and the water will be treated with lime and soda in order to soften it; and then, after extended sedimentation, will pass through mechanical filters. A coagulant will be used, before applying the water to the filters, if this proves to be necessary. It is believed, however, that the lime and soda used for softening, in the case of Columbus water, will incidentally effect coagulation to such an extent that good results can be obtained by filtering without using any other chemicals, such as sulphate of alumina or sulphate of iron, except possibly at times when the water is extremely turbid.

In accordance with condition (b) of the approval given February 7, 1905, provision has been made for establishing well equipped laboratories.

This report was presented to the Board at its meeting held October 25, 1905, and the detailed plans and specifications, submitted June 14, 1905, were approved. The Board also voted to call the attention of the city authorities to the fact that although condition (a) in the Board's approval of the general plans had been complied with, condition (b) in so far as it related to operation of the plant was still in effect.

REPORT ON PROPOSED WATER SUPPLY FOR DELTA.

On April 25, 1905, The Riggs and Sherman Company, consulting engineers for the village of Delta, submitted plans for proposed water supply. In anticipation of these plans being submitted, the engineer visited Delta on February 20, 1905, and collected samples from certain wells in the village for the purpose of studying the ground water at that place. The following report was made:

Delta is a village of about 1,300 population located in Fulton County. The corporation is a little over one mile square. There is at present no public water supply.

It is estimated that when waterworks are installed, the supply will be used by about 1,000 people and the daily consumption will be 250,000 gallons. The water will be used for all purposes.

It is proposed to obtain the supply from a driven well 213 feet deep, owned by the Toledo and Indiana Electric Railway Company and now used for a water supply for its power station. The formation pierced by the well is as follows: 6 feet of sand, 50 feet of clay, 5 feet of sand, 30 feet of clay, 5 feet hard pan, 14 feet water-bearing sand and gravel, 9 feet water bearing slate, shale, 100 feet black slate. The water is obtained from the gravel at a depth of about 100 feet. The available quantity of water from the well has been found through continued use to be sufficient to supply the village.

The well is located upon a one-acre lot in the center of the village. This acre would be controlled by the village if the waterworks are installed. There are probably 25 houses within 500 feet of the lot and the village is growing quite rapidly. The geological formation, however, would be a great protection to the quality of the water in the well for some time to come. The water is to be pumped from the well by two deep-well pumps and raised into a 60,000 gallon tank 110 feet high. This will give a domestic pressure of about 50 pounds. An additional pump is to be installed for use in case of fire.

Samples of water from this well and also from deep wells in other parts of the village have been analyzed. (For report of analyses of these samples see laboratory report on water supplies). The results of the analyses indicate in all cases a safe water as regards organic pollution, but one which contains a large amount of mineral constituents. A practical illustration of this is the fact that the railroad company much prefers to use surface water from a small stream some distance away, for boiler purposes, when such surface water can be obtained.

The only other available source of supply for the village would be a small stream which it would be necessary to impound at a point some miles from town and the water from which would require filtration. The cost of such a supply is beyond the present resources of the village.

This report was presented to the Board at a meeting held April 26, 1905, and this source (from a deep well located beneath the power station of the Toledo & Indiana Railway Company and owned by that company) was approved as a public water supply upon the condition that the Board reserve the right to condemn it and cause the village to seek another supply, if at any time this well becomes organically contaminated.

REPORT ON PROPOSED WATER FILTRATION FOR FOSTORIA.

June 13, 1905, Mr. C. J. Peters, of Tiffin, as consulting engineer for the city of Fostoria, submitted plans for a proposed slow sand filtration plant to be used for filtering both the present and the proposed additional

water supply for that city. These plans were referred to the engineer of the Board and the following report was made:

PRESENT CONDITIONS.

Fostoria has a population of about 8,000. The total water consumption is about 600,000 gallons daily, and is taken from the East Branch of the Portage River about one-half mile south of the city limits. The water is diverted through a system of gates into a canal about three-fourths of a mile long leading to the "Upper Reservoir," which has an area of twelve acres, a depth of six feet and a capacity of about 25,000,000 gallons. From this reservoir the water is led through a 3-foot conduit 4,000 feet long, into the "Lower Reservoir," which has an area of 18 acres, a depth of 19 feet, and a capacity of 120,000,000 gallons. The upper reservoir is not paved nor was the surface soil removed from the bottom when it was built. The lower reservoir is well built and the sides carefully paved.

The East Branch of Portage River above the intake canal has a watershed of about 20 square miles, upon which there are probably six or seven hundred people living. At one settlement, West Independence, there are from one hundred to two hundred people. It is decidedly possible, therefore, that this stream could be polluted by infectious matter.

From the lower reservoir the water flows on to a filter having an area of 6,300 square feet and composed of some 18 inches of gravel. The water is collected from beneath the gravel by wooden underdrains and conveyed to the pump well and also to a clear water basin, holding some 500,000 gallons. The pump well and the clear water basin together have a storage of about one day's supply.

The filter, so-called, acts simply as a strainer and removes the coarser suspended particles only, as shown by several examinations by the State Board of Health. It is cleaned about once a year by removing the material and replacing it with new.

In addition to the above sources of supply there are three deep wells, located near the pumping station, which are used when the water in the reservoirs is low. These wells, however, altogether do not furnish one-half enough water to supply the city.

PROPOSED PLAN.

On account of the inefficiency of the present supply it is proposed to provide an additional supply by establishing a new intake and slow sand filtration plant at a point near the present pumping station and a mile and a half or two miles, by following the river, below the present intake. The reason for establishing this new intake at this point is due to the fact that at a quarry, located somewhere below the present intake,

water is constantly being pumped into the creek so that the flow by the pumping station, due to the water from this quarry as well as from the run-off from the upper part of the watershed, amounts to about enough to supply the city without storage.

A dam is to be built in order to raise the water a foot or so and cause it to flow by gravity onto a filter to be similar in construction to the one already in use. After passing through this filter the water will flow into the present pump well.

A new intake was approved by the State Board of Health on December 12, 1904, with the conditions:

First—That filters of either the mechanical or slow sand type, of a design satisfactory to the State Board of Health, be constructed before the water from said proposed new intake is delivered to consumers; and,

Second—That the drainage from the Catholic cemetery be conveyed to a point on the creek below the proposed intake.

PROPOSED WORK.

In accordance with the above condition No. 1, therefore, plans for a slow sand filter plant are now submitted.

These plans provide for two filters, each 160 feet by 68 feet, having together a total area of .52 acres and containing four feet of filtering material consisting of sand, gravel and broken stone. This material is to rest upon a four-inch concrete bottom and be enclosed by vertical concrete walls of such proportions that the filters may be covered in the future, if necessary. The filters will be at an elevation below the surface of the ground which may, to a certain extent, prevent them from freezing.

The sand to be used is to be the same as the sample already submitted to the Board, which has an effective size of .27 mm. and a uniformity coefficient of 2; or such sand as will fulfill the requirements of the State Board of Health.

With an average daily consumption of 700,000 gallons at Fostoria the average rate of filtration will be only about 1,400,000 gallons per acre per day. The water on the sand will be maintained at a constant depth of from two to three feet and the discharge of the effluent will be regulated by an automatic controller, so that an excessive rate of filtration will never be possible.

The effluent from the filters will pass into a concrete clear water basin, having a capacity of about 450,000 gallons, or over half a day's flow. Additional storage is also provided in the pump well and also in the present standpipe which holds over 300,000 gallons.

These plans were considered by the Board, at a meeting held June 14, 1905, and the same, providing for two sand filters, each .26 of an acre in area, having concrete bottoms and sides and containing at least four feet of filtering material, were approved provided:

First—That the filters and also the clear water basin be covered whenever, in the opinion of the State Board of Health, it is shown that proper results at Fostoria cannot be obtained with the uncovered filters.

Second—That the bottom six inches of filtering material be composed of clean gravel or broken stone, all of which will pass through a screen having a 2.5-inch mesh and which will be retained upon a screen having a one-inch mesh; that the next three inches above shall be composed of clean gravel or broken stone, all of which will pass through a screen having a one-inch mesh, but be retained upon a screen having a clear mesh of three-eighths of an inch; that the next three inches be composed of fine broken stone or gravel, all of which will pass a screen having a clear mesh of three-eighths of an inch, but which must be coarser than the sand used for the upper portion of the filter, and be entirely free from clay, dust or other fine material; that the upper three feet of the filtering material be composed of sand of the same size and character as the sample of "local bank" sand, marked No 2, submitted to the Board on June 12, 1905, by the consulting engineer, after all stones greater than three-eighths of an inch in diameter have been removed from said sample; or be composed of sand, representative samples of which will fulfill the following requirements: Not more than ten per cent. shall pass the sieve having a clear mesh of .27 of a millimeter, and at least ten per cent. shall pass a sieve having a clear mesh of .40 of a millimeter; at least 70 per cent. shall pass through a clear mesh of .83 of a millimeter, and at least 90 per cent. shall pass through a clear mesh of 2.5 millimeters (about three thirty-seconds of an inch); sand shall be practically free from clay, dust or organic impurities and shall be washed before being placed in the filter, if deemed necessary by the State Board of Health.

Third—That if the sand represented by the above mentioned sample No. 2 of local bank sand is used, such sand shall either be washed before being placed in the filters or else the water which first passes through the filters shall be wasted until found, upon examination by the State Board of Health, to be free from any clay or organic matter taken up from the filtering material.

Fourth—That the old gravel filter near the pumping station be abandoned and the entire public water supply of Fostoria be passed through the new proposed filters.

Fifth—That the water direct from the creek through the new intake be used only when such water is clear.

Sixth—That any changes in the management or operation of the filters be made when requested by the State Board of Health.

REPORT ON PROPOSED WATER SUPPLY FOR
FREDERICKTOWN.

June 27, 1905, Mr. Thomas Cureton, of Columbus, the consulting engineer for the village of Fredericktown, submitted plans for a proposed water supply for that village. Samples of water from certain preliminary test wells had already been analyzed at the laboratory of the State Board of Health, and in anticipation of these plans being submitted, Fredericktown was visited by the engineer of the Board February 23, 1905, and the following report was made:

Fredericktown is a village of about 1,000 population, located in Knox County on the Kokosing River, or Owl Creek, a tributary of the Muskingum River.

There is no public water supply at present, the people depending upon cisterns and wells of various depths; nor are there any sewers, although, on account of the proposed waterworks, a system of sewers is already being talked of.

It is proposed to construct a dug well, 25 feet in diameter and about 16 feet deep, in a location immediately west of the westerly corporation line of the village and about 500 feet west of Taylor Street, which approximately defines the edge of the built-up portion. The closest sources of pollution are three houses provided with privy vaults, about 400 feet distant. Surface drainage from these houses, as well as from the entire village, is, however, effectually cut off by means of a ditch.

Four test wells, consisting of four-inch pipe, have been sunk within 100 feet of the proposed location of the present well. One of these wells has been pumped continuously for twenty-four hours, yielding 200,000 gallons during this period, and samples of it were taken before and after pumping. The level of the water in this well, which stands at six feet below the surface, was not lowered appreciably during this test. The wells are sunk through 17 feet of clay mixed with gravel and 17 feet to 25 feet of gravel and sand from which the water is obtained. Underlying this sand and gravel is rock.

It is proposed to pump the water from the large well by means of two 500,000 gallon pumps, driven by gas engines, into a tower to be 120 feet high, holding 40,000 gallons or about one day's supply for the village. It is also proposed to lay several thousand feet of water mains at once.

The analysis of the samples submitted indicates a safe and desirable water for a public supply. (For analysis of this water see laboratory report on water supply.)

The Board approved the territory immediately west of the westerly corporation line of Fredericktown and immediately south of High Street, for a public waterworks for the village, July 5, 1905, provided that the land within 400 feet of any well which might be used in connection with said waterworks be owned or controlled by the village and that no source

of pollution, which in the opinion of the State Board of Health would affect the public water supply, be allowed within said 400 feet of any well.

REPORT ON PROPOSED NEW WATER FILTRATION PLANT AT LORAIN.

On September 7, 1905, general plans for a water filtration plant for Lorain were submitted to the Board for approval. On October 28, 1905, detailed plans of the same plant were submitted. The engineer of the Board examined these plans and the following report was made:

The water supply of Lorain is at present taken from Lake Erie and filtered through six mechanical filters of the early Jewell type. This filter plant was installed in 1897 and has been in operation ever since. The plant was approved by the State Board of Health in 1897, with the condition that at least 2.5 grains of alum should be used with each gallon of water and that the rate of filtration should not exceed 100,000,000 gallons per acre per day. These conditions were imposed in the Board's approval after a thorough examination of the plant, covering a period of five weeks, soon after its construction, by Mr. Allen Hazen, of New York, assisted by Mr. Hollis and Mr Flynn.

The conditions imposed at that time have not been observed to any extent except, perhaps, at first. The amount of alum was reduced to less than one grain and, occasionally, no coagulant whatever has been used. Since the water consumption has increased the filters have been operated at a much higher rate than was approved by the Board.

In 1900, upon request of the superintendent of the Lorain waterworks, the State Board of Health gave its permission to the city to experiment with the use of iron, in the form, so-called, of iron sulphite, as a coagulant. After using it for a year or two it was found that certain parts of the machinery and the strainer system of the filters were practically destroyed by the action of the iron sulphite and it was necessary to renew them.

In 1903 permission was granted to the city to make a test of the use of copperas or iron sulphite, together with lime, as a coagulant instead of alum "for a sufficient length of time to determine its efficiency; a daily report on results obtained to be made to the Board during that period." A report showing the daily results from June 8, 1903, to February 29, 1904, was submitted to the Board and these results were quite favorable. No action, however, has ever been taken by the Board approving of the use of this coagulant unconditionally, although its use at Lorain has been continued from the latter part of 1903 up to the present time.

The following table shows the typhoid death rate at Lorain from 1892, five years previous to the introduction of filters, up to the present time:

Year.	Population estimated.	Typhoid death rate per 100,000 pop'l't'n	Average.
1892	5,600	53	
1893	6,000	183	
1894	8,200	48	
1895	11,400	121	
1896	12,000	83	
*1897	12,300	24	
1898	14,100	21	
1899	15,000	26	17
1900	16,028	12	
1901	18,000	0	
1902	20,000	25	
1903	22,000	59	
1904	24,000	38	48

*Filters installed.

The results obtained with the Lorain filter plant were, during the first few years of its operation, very favorable, judging from the reduction in the typhoid fever death rate, in spite of the fact that an insufficient amount of coagulant was used most of the time. During the last two years, however, due to the greatly increased population and consequent increased water consumption in Lorain, the filters have been badly over-worked and have at times been out of repair. This fact may be responsible for the decidedly increased typhoid death rate during the last two years.

The present population of Lorain is estimated at about 25,000, the large increase being due principally to the establishment of a steel plant at South Lorain; and the water consumption is probably 4,000,000 gallons per day. About 20 per cent. of the daily consumption is used for manufacturing purposes.

PROPOSED PLANS.

It is now proposed to construct a mechanical filtration plant adjacent to the present plant and utilizing as a coagulating basin a concrete reservoir which has recently been constructed by the city. The new plant will have a nominal capacity of 6,000,000 gallons, but will be equipped, immediately, only sufficiently to treat half that amount of water. The plant will be completed a year hence. It is proposed for the first year to use the present works in connection with the new works, equipped with half

capacity; but at the end of a year, when the new works are completed, it is intended to entirely abandon the old works. The proposed plans call for six filters, each being about 20 by 25 and having 441 square feet net filtering area. They will be placed in two parallel rows over the clear water well and separated by the pipe gallery and operating floor.

The water after being subjected to a coagulation period of one, two or three hours (based on a 6,000,000 gallon capacity) flows by gravity to the filters. No provision for preliminary subsidence has been provided as the water will be taken from the lake at a considerable distance from the shore and will rarely be turbid enough to warrant preliminary subsidence.

The coagulated water is distributed over the filters by means of one main central trough running longitudinally and six lateral troughs leading out of it to either side. These troughs or gutters are designed to prevent the filtering material from being washed into them when the filter is being cleaned.

The filtering material consists of 4 feet of sand and gravel, described as follows: 6 inches of gravel of such size that all will pass a $\frac{1}{2}$ -inch clear mesh and be retained on a $\frac{1}{8}$ -inch mesh, and 42 inches of sand of specially selected silicious material with grains of uniform size.

The strainer system beneath the filtering material is to be the standard design of the Pittsburgh Filter Manufacturing Company and is patented by them. The effluent controllers are also of a special design of the company and are said to be efficient in obtaining a constant rate of flow from the filters regardless of the condition of the filtering material. With the plant working at the rate of 6,000,000 gallons per day the rate of filtration will not exceed 100,000,000 gallons per acre per day. This is only about 80 per cent. of the rate usually used and will allow for operating the plant a little faster in case of fire, without using an excessive rate.

The filters are to be agitated, when washing, by means of compressed air and wash water is to be forced backwards through the strainer system in the usual manner. The air pipes are separated from the strainer system and several inches above it. By this arrangement the air and water can be used at the same time and more effective cleaning probably obtained.

The pipe gallery is well arranged so that all valves are accessible and no opportunity is permitted for the raw water to leak into any filtered water pipe. Instead of the usual iron pipes for the sewer and for conveying the raw water to the filters, rectangular conduits are to be used. Small pumps are to be provided for forcing a continuous stream of filtered water from each filter, as well as water or coagulated water to the sampling table corresponding; so that samples of filtered and other water may be easily collected at any time.

The following article in the specifications relates to the purification to be obtained:

"On completion of the work to be performed, the contractor shall

furnish an operator for fifteen (15) days to superintend the operation of the plant, during which time the city may have the water tested and analyzed to determine the degree of purity obtained, which shall be as follows :

"The purification obtained shall be such that in no case shall the average number of bacteria in the filtrate exceed 100 per cubic centimeter, except when the number of bacteria in the applied water shall exceed 2,500 per c.c., in which event the average reduction of bacteria in the filtrate shall be at least 98 per cent.

"Not more than 5 per cent. of the individual samples of the filtrate shall show more than 150 bacteria per c.c., not more than 5 per cent. of the sample of the filtrate shall show an efficiency as low as 90 per cent. No trace of undecomposed coagulant shall be left in the filtrate nor shall the filtrate show any increase in iron or alumina. The filtrate shall show no acid. The filtered water shall be bright, clear, and practically free from color, turbidity or matter in suspension and shall be furnished at the rate of 3,000,000 gallons of water per day."

All valves are to be hydraulically operated. By this method a minimum effort on the part of the operator is required and the plant is likely to receive more faithful care than it would if the valves required decided physical effort to open or close them.

The mixing tanks and other devices in use at the present plant will be used also for mixing and applying the coagulant to the water which is to be purified at the proposed plant, until the present plant is abandoned. These devices permit the use of both sulphate of alumina or sulphate of iron and lime as a coagulant. When the present plant is abandoned there will be installed at the proposed plant, according to the plans submitted, devices which will allow the use of both kinds of coagulant.

After the plant has passed into the hands of the city, the present chemist and superintendent of filtration will have charge and will make frequent analyses of the water. A laboratory is already established, at the old plant, which is to be used in connection with the new one.

The proposed clear water basin beneath the filters has a capacity of 600,000 gallons, or about two hours consumption. The present small clear water basin can also be utilized. The combined capacity of both is none too great.

This report was referred to the State Board of Health and on November 14, 1905, the Board approved the plans for proposed new filter plant for the city of Lorain, as shown on drawings submitted to the State Board of Health by the Pittsburg Filter Manufacturing Company on September 7 and October 28, 1905, provided that the management and operation of the plant, the use of the coagulant, and the method of controlling the rate of filtration be subject at all times to the approval of the State Board of Health.

The Board also advised the authorities that the present and proposed

facilities for storing filtered water were not sufficient to allow for any considerable increase in the water consumption; and that unless greater storage capacity was provided the new filter plant, as had been the case with the old one, would, within a few years, be operated at excessive rates at times and poor results would be obtained. Attention was also called to the decrease in the typhoid fever death rates during three or four years following the introduction of the first filter plant when that plant was doing good work; and to the decided increase in the typhoid fever death rate during the last few years when the filters have been over-worked.

REPORT ON PROPOSED WATER SUPPLY FOR LOVELAND.

December 22, 1905, plans were submitted for a proposed water supply for the village of Loveland by H. C. Hubbell and Company, which company had obtained a franchise for supplying water, light and heat to the village. In anticipation of these plans being submitted, and also in connection with making preliminary investigations for a water supply, the engineer of the Board visited Loveland May 10, 1905, and again on June 19, 1905. The following report was made:

Loveland is a village of about 2,000 population, covering an area of 1.2 square miles and located in Warren, Clermont and Hamilton counties, on the Little Miami River about twenty miles northeast of Cincinnati.

There is at present no public water supply for the village, the population being supplied entirely by private wells and cisterns. After the completion of the water system, now proposed and under construction, it is expected that about half the population, living in districts covering about half the total area of the village, will be supplied with water. The ultimate capacity of the distribution proposed is 1,000,000 gallons per day, which is enough to supply a village of several times the present population of Loveland.

The proposed supply is to be derived from drilled wells located upon an island in the Little Miami River immediately above the built-up portion of the village. The island is about 1,000 feet long and 150 feet wide and has been purchased by the water company. The lower end of this island is 300 to 400 feet distant from the nearest house, while the upper or north end is 1,000 feet distant from any habitation.

The Little Miami River above Loveland has a watershed of about 1,000 square miles which is comparatively sparsely settled. There are, however, a few communities, notably Wilmington, Blanchester, Xenia, Ohio Soldiers' and Sailors' Orphans' Home, Greene County Infirmary and Wilberforce College, where more or less sewage enters the stream or its tributaries. The total population upon the watershed above Love-

land is 80,000 to 90,000. The river water, therefore, is not seriously polluted at this point. It is improbable, however, though not impossible, that the proposed wells are influenced by the river water.

The two wells which it is proposed to use at present are located on the northerly end of the island just within the corporation and about 1,000 feet from any habitation. These wells are about 50 feet apart and each is 50 feet deep. The 8-inch iron casings have Cooke strainers attached at the bottom. The formation pierced in sinking the wells was as follows: 11 feet of sandy loam, 8 feet of coarse gravel and 31 feet of fine gravel and sand. The water stands normally in the wells at a point about 11 feet below the surface of the ground.

The two test wells, known as No. 1 and No. 2, were pumped for sixteen days continuously and each well was found to yield 800 gallons per minute. At this rate the daily yield of both wells would be over 2,000,000 gallons per day, which is an abundant supply for the village.

The water from the wells will be drawn through a suction pipe about 1,500 feet in length, by pumping machinery located near the center of the village and operated in connection with an electric light and heating plant. The water will be raised into a 120,000 gallon tank, or tower, from which it will be distributed to the village under an average pressure of about 75 pounds.

Analyses of samples collected from the wells No. 1 and No. 2 on October 30, 1905, show the water to be quite satisfactory for a public supply. Samples collected in June, 1905, from a test well located near the village upon the southerly end of the island and 700 or 800 feet from the wells now proposed, indicated a water which, though not dangerous at the time of sampling, contained evidences of influence from the village. The use of these preliminary wells has been abandoned and the wells now proposed for use contain no such suspicion of pollution. (For analyses of this water see laboratory report on water supplies.)

January 2, 1906, the Board approved the proposed source of public water supply for Loveland, to be obtained from wells designated as No. 1 and No. 2, and located upon an island near the northerly corporation line of Loveland, as shown on a drawing submitted to the State Board of Health on December 22, 1905, provided that no other wells be used in connection with the public supply unless the use of such other wells first receive the approval of the State Board of Health.

REPORT ON PROPOSED ADDITIONAL WATER SUPPLY FOR LYNCHEURG.

It was learned that the village of Lynchburg intended making use of a new well owned by the distillery company for water supply purposes.

Lynchburg was visited by the engineer of the Board on February 10, 1905, and the following report was made:

In 1900 the State Board of Health approved of "Sulphur Spring," located one and one-fourth miles east of the village on low land near a small run, as a source of water supply. This has been used up to last fall when the yield of the spring proved inadequate. About this time the Lynchburg distillery company began searching for water on land owned by the company, adjacent to the land on which Sulphur Spring is located. A well was sunk by the distillery company which yielded apparently a good supply of water both as regards quality and quantity. The water in this well being higher than the water in Sulphur Spring, it was, with the permission of the distillery company, conveyed by gravity into the Sulphur Spring in order to make up the deficiency in the supply from the latter.

The water from the distillery well has continued to flow in this manner into the Sulphur Spring up to the present time and it is proposed by the village to thus use the well or else sink new wells in the immediate vicinity.

The distillery well is located two or three hundred feet northeast of the Sulphur Spring at the edge of elevated ground which extends for a long distance in a northeasterly direction and which is used for farm land and contains little habitation. Southeasterly from the well, however, is one house, barn and pig pen, located on an abrupt hill, the drainage from which might reach the well during extremely hard rains unless it is thoroughly protected.

The well consists of a rectangular excavation 12 feet by 24 feet and 6 feet deep, lined with plank. In the bottom of this excavation a pipe is sunk to a depth of 10 or 12 feet. The material passed through is principally gravel and sand. The water rises nearly to the surface of the ground.

The analysis of the water shows it to be safe for a public supply, (For analysis of this water, see laboratory report on water supplies.)

In case the supply from this well is found to be insufficient for both the village and the distillery, the village intends drilling other wells, as suggested above, in the immediate locality.

March 3, 1905, the Board approved the use of the water from the well owned by the distillery company and located one and one-fourth miles northeast of the village, for public water supply purposes, provided that it be safely protected from the entrance of surface water. The Board also approved the area within 150 feet of the present well as a location for other wells provided the water from such future wells proves satisfactory to the State Board of Health.

REPORT ON PROPOSED WATER SUPPLY FOR MIAMISBURG.

On April 14, 1904, the Grove lot location for Miamisburg waterworks was inspected by the engineer of the Board and samples of water from a test well thereon collected. An informal report, disapproving this location, was given Mr. J. G. Jacobs, a member of the board of trustees of public affairs, and through him the village was advised to seek a location south of town.

A location near the south corporation line of the village, between Main Street and the Great Miami River, called the Mayo lot, was chosen and, at a meeting of the State Board of Health held April 27, 1904, and upon a verbal statement from Mr. Jacobs, was approved, provided the analysis of water taken from wells at this place proved satisfactory to the Board. The analysis, made soon after, showed a suitable water and the supply was approved and the village so notified. (For analyses see laboratory report on water supplies.)

Difficulty arising in regard to securing this approved location upon terms favorable to the village, the trustees desired to return to the Grove lot location, already informally disapproved (April 14, 1904), but refrained from so doing upon receiving the formal disapproval of the State Board of Health.

The village then purchased the Zunkel lot, about 600 or 700 feet east of the Mayo lot, but nevertheless apparently more subject to influences from the village. Five wells were driven and the construction of the pumping station begun before the Board learned of this change. On August 30, 1904, soon after the Board became cognizant of the situation, Miamisburg was visited by the engineer and the Zunkel lot inspected. He reported as follows:

This lot contains nine acres and is situated upon the south corporation line of the village, being bounded on the west by the Big Four Railroad and on the east by a steep hill, said to be of solid rock, extending far below the surface. The reservoir is to be located upon this hill.

The built-up portion of the village lies within about 500 feet from the northerly and westerly boundaries of the lot and there are no houses within less than this distance.

The drainage and the direction of ground water flow is from the direction of the easterly part of the village toward the lot.

Five 8-inch wells have been sunk through a distance of about 50 feet to the bed rock. The material passed through was sand and gravel, rather fine toward the surface but growing very coarse toward the bottom.

Each well has been tested with a steam pump for a period of five hours and is said to be capable of yielding 450 gallons per minute.

Samples of water were collected on August 30, September 20 and 29.

after the wells had been subjected to more or less pumping. Analysis of these samples showed some apparent influence from the village.

The construction of the pumping station and the development of the works had been continued and at the time of the collection of the last samples they were well on toward completion; therefore, at its regular meeting, held October 20, 1904, the State Board of Health decided to postpone action regarding this supply until samples could be obtained from the wells after thorough pumping with the machinery.

On March 23, 1905, in response to a letter from the president of the board of trustees of public affairs, Miamisburg was again visited. It was found that the works were entirely completed and that water had been pumped from the wells continuously, during the day time, for several weeks. This water had not been offered for domestic use, but had been wasted or used for making fire tests.

Samples were collected and sent to the laboratory. The analysis shows no material change over past samples from the same source. The water is, at present, safe for domestic use, but shows slight indications of influences from the village drainage.

If the water proves unsafe, the suction mains could probably be extended to a better location, using the same pumping station and machinery.

This report was considered by the Board at its meeting held April 26, 1905, and it was voted to permit the use of this water, namely, from wells located on land owned by the village and formerly known as the Zunkel lot, pending further examinations to be made later on.

REPORT ON PROPOSED WATER SUPPLY AND WATER FILTRATION FOR NEWARK.

On July 7, 1905, Mr. Henry I. Buell, of Zanesville, representing Mr. Lewis K. Davis, of Pittsburg, Pa., and Mr. J. P. Lamb, president of the board of public service, submitted plans for a proposed water supply and water filtration plant for Newark. After some formal discussion with the designing engineer, this set of plans was withdrawn and a revised set was submitted on July 18, 1905. These plans were examined by the engineer of the Board and in connection with studying them he visited the filtration plant of the Indianapolis Water Company at Indianapolis, Indiana, which plant is similar in many respects to the one proposed for Newark. The following report was made:

The city of Newark, Licking County, has a population of about 20,000. The present waterworks were established in 1886 by a private concern, the Newark Water Company. The water was first obtained from two brick lined wells, dug in the gravel near the northerly corporation line of the city by the side of the north branch of the Licking River.

Later these wells were supplemented by twenty-four 4-inch driven wells, located at the same place. This supply proved inadequate, however, and therefore a small dam was built across the creek and the creek water diverted directly into one of the old dug wells from which it was pumped to a distributing reservoir located upon a nearby hill. Water is now being supplied to the city of Newark by this method.

A few years ago the water company installed mechanical filters, the plans for which were approved by the State Board of Health, but these filters have only been used occasionally when the water in the creek has been especially turbid.

The franchise of the water company expires in 1906 and the city does not wish to renew it. As the city and the water company cannot agree upon the value of the works of the company the city will not buy them. An entirely new system will, therefore, be built by the city.

In January, 1904, plans for a new water supply, to be taken from the north fork of the Licking River just above the present intake of the water company, were submitted to the State Board of Health and approved subject to the condition "that the water be filtered in a manner satisfactory to the State Board of Health before being offered to consumers."

Since these plans were approved the city has decided not to use them, but to have new ones prepared, providing for larger water mains and also for a slow sand filtration plant. These plans are now submitted to the Board for its approval.

The source of supply, under the present proposed plans, will be the north fork of the Licking River, taken a short distance above the present intake and at practically the same location approved in the plans submitted in 1904, under the condition above quoted.

In connection with making a report upon these previous plans a large portion of the watershed of the north branch of the Licking River above Newark was inspected. Several sources of pollution were found. This watershed contains 230 square miles and is covered in part by uninhabited woodland and in part by sparsely settled farm land. The stream is fed by a large number of tributaries, originating in springs located in the gravelly hills around the outer part of the watershed. There are, however, sixteen communities, each having over 100 inhabitants, located upon the watershed. The total population of these communities is over 5,000. In addition to this pollution there are also a large number of persons living in isolated houses, but which may nevertheless drain into the river or one of its feeders.

At Utica, however (population 1,400), which is the largest community on the watershed, there were, at the time of inspection in 1904, three drains which discharged domestic sewage into the stream; and it was proposed to dispose of more sewage in like manner. There were also found to be several surface drains at this place and in addition the stream receives more or less refuse and rubbish, if not sewage, from

about a dozen stores and houses located upon its banks. Two slaughter houses just below the village are so located that the drainage may reach the stream in time of heavy rain.

Since making the inspection in 1904 there have been several cases of typhoid fever at Utica, and the sewage from one or more of the patients was discharged into the stream; only twelve miles above the water supply of Newark. Fortunately no epidemic resulted in Newark, however, and the health authorities took immediate steps to have some of the drainage into the river at Utica cut off.

Other communities upon the watershed, although not provided with sewers, are nearly all located upon or near one of the numerous tributaries of the river and the drainage from privies and barnyards may find its way at times into the stream.

Water from the river just above Newark has been analyzed several times by the State Board of Health and found to be unsatisfactory for a public supply. In addition, daily turbidity observations have been made, under the direction of the United States Geological Survey, of the Licking River at a point about 15 miles below Newark. These observations show that the river water at times contains a turbidity as high as 2,000, while for periods of seven days or more the turbidity is sometimes over 100. The river below Newark, however, at the point of observation may be slightly more turbid than the north fork of the Licking River, which it is proposed to use as a water supply.

The filtration system proposed consists in slow sand filtration supplemented by preliminary treatment in auxiliary, or roughing filters, sometimes called scrubbers; together with the application of alum to the raw water at times of excessive turbidity. The plant is to be built almost entirely of concrete, or of concrete-steel construction.

At the proposed point of intake, about one-fourth mile above the northerly corporation line, will be constructed a wooden crib, 12 feet by 16 feet by 7 feet, surrounded by and filled with broken stone. Leading from the center of this crib will be a 30-inch conduit, about 1,000 feet long, constructed of double strength sewer pipe. This conduit will convey the river water to the low lift pumps, which will raise it directly to the slow sand filters, or force it through the auxiliary filters as described below.

The auxiliary filters or "scrubbers" are designed for the purpose of removing as much of the suspended matter in the raw water, as possible, before applying to the slow sand beds. These auxiliary filters are two in number. Each is a concrete basin 72 feet long, 12 feet wide, with a total depth of about 14 feet. The filtering materials consist of 10 inches of broken stone, 6 inches of gravel and 5 inches of sponge clippings, resting upon an iron frame work, 5 feet above the bottom of the basins, the sponge clippings being uppermost. The raw water is passed in at the bottom, and is forced upward through the material and overflows into a pipe leading through the gate house, to the slow sand filters.

Provision is to be made for the introduction of alum into the raw water, at the low lift pumps before the water is passed from the auxiliary filters. This is to be done when the turbidity of the raw water is so great that the auxiliary filters, without the use of a coagulant, cannot render such water suitable for application to the slow sand filters. The space beneath the iron frame work in the auxiliary filters forms settling basins which will aid in removing the grosser suspended matters, especially when alum is used.

With the present daily water consumption at Newark the rate of filtration through the auxiliary filters will be about the same as the usual mechanical filtration rates; with the nominal capacity of the plant, 6,000,000 gallons per day, such rate will be about twice the rate usual with mechanical filters. Such treatment, especially when a coagulant is used, ought to render the water clear enough to be treated satisfactorily by slow sand filters. During certain periods, the turbidity of the raw river water will probably be so low that it can be applied directly to the sand filters, without preliminary treatment.

The slow sand filters are four in number, two of them being 100 by 150 feet in area and the other two 100 by 140 feet; the total area is 1.35 acres. It is not proposed to cover the filters, although the walls are suitably designed to sustain a roof if it is desired to cover them in the future.

On the level concrete floors of the filters are placed parallel lines of rectangular vitrified drain tile, perforated on top with one-half inch circular holes, about 3 inches apart. Each tile is 2 feet long, 1 foot wide and 6 inches deep, and is divided by intermediate partitions into three equal sections. These tile underdrains cover the entire bottom of the filters. Each line of drain is open at both ends and one end leads into the collecting gallery extending across one side of the filter, while the opposite end leads into a semi-circular 18-inch drain, extending along the opposite side of the filter. This design enables the underdrains to be flushed out in case they should contain any sand, gravel or other objectionable material.

The lower filtering material is to consist of a 6-inch layer of broken stone or gravel resting upon the underdrains; such layer to contain no stones "larger than will pass through a 1½-inch ring, and no stone shall be small enough to pass through a ¾-inch ring." This layer of stone is to be thoroughly washed before being placed.

Above this layer is to be placed "one inch of gravel which is to pass a screen of clear mesh one inch and which will remain upon a screen with a mesh of ⅜-inch, and upon this shall be placed one inch of gravel which is to pass a screen with a clear mesh of ⅜-inch and which is coarser than filter sand and entirely free from fine material."

This material is also to be thoroughly washed before being placed.

Upon this gravel is to be placed the filter sand proper which is to have a thickness of not less than 3 feet.

The specifications for this sand are as follows:

"The sand shall be clean bank sand or equal thereto, screened and washed so as to insure a perfect cleanliness and grain size. It shall be entirely free from loam, coal dust, roots or other impurities. The grains of the sand shall be of hard material which shall not disintegrate and shall be of the following dimensions: Not more than 1 per cent. less than 0.13 of a millimeter, nor more than 10 per cent. less than 0.24 of a millimeter; at least 10 per cent. shall be less than 0.34 of a millimeter; at least 60 per cent. less than 0.83, and at least 85 per cent. less than 2.10 millimeters."

The inner side of the filter walls below the sand line are stepped off in five steps, $1\frac{5}{8}$ inches in width, in order to offer an obstruction to the raw water passing down along the wall to the drains.

Each inlet pipe leading on to the filters is controlled by an automatic float valve, located in a suitable chamber at the corner of the filter. This float valve is designed to maintain the water on the sand at a constant depth.

The collecting gallery, extending along one side of each filter, is to be formed by constructing a narrow wall parallel to the main filter wall and about 3 feet from it and resting upon the tile underdrains. The space thus enclosed is to be covered and provided with manholes. At the outlet end of each gallery is a 12-inch Ventruri meter, by means of which the rate of filtration can be accurately determined at any time or a continuous record obtained automatically.

A gate house, 20 by 35 feet, conveniently located, contains the necessary apparatus for obtaining the flow through the Ventruri meters, and also controlling devices for regulating the flow through each of the four beds.

The principle of these controlling devices is a floating weir made in an annular or telescopic form. This telescopic weir is carried by a float and is regulated by a wheel on an indicator stand. By raising or depressing the valve, the depth of water flowing from the weir is decreased or increased at will. When once set to any required depth the rate of flow should be constant.

The slow sand filters will be operated continuously at an even rate not exceeding 2,200,000 gallons per acre per day under the present daily consumption of 3,000,000 gallons; or 4,400,000 gallons per acre per day under the nominal daily capacity of the plant which is 6,000,000 gallons. It is not believed that the daily consumption at Newark, however, will be as high as 6,000,000 gallons for many years.

From the gate house the filtered water will flow into a covered steel-concrete water reservoir, holding about 3,000,000 gallons. The reservoir is to be 140 feet by 180 feet and 16 feet deep below the flow line.

The outlet of the clear water reservoir leads into a suction well near the pumping station, through which the water is to be pumped, by hori-

zontal crank and fly-wheel pumping engines, directly into the distribution system. No distributing reservoir will be provided, but the pumps will be operated continuously. The domestic pressure will be 80 pounds and the fire pressure 130 pounds.

The plans call for about 20 miles of water mains, 1 inch to 16 inches in diameter. Leading from the pumping station to the city, there are to be two 16-inch force mains.

The slow sand filters are to be cleaned by carefully scraping the dirty sand into heaps and conveying it to storage bins through sand ejectors, operated by water under pressure. At convenient times, or when the depth of sand on the filters has been considerably decreased, the sand is to be washed by two sand washers, each located near a storage basin, and conveyed back to the filters through the ejectors, by a reversed current of water.

The sponge clippings, constituting a part of the filtering material of the auxiliary filters, will have to be removed and washed when clogged. The broken stone underlying the sponge can probably be washed by a reverse current of water.

It is stated by the designing engineer that the contractor building the plant will be required to guarantee a purification such that the effluent will contain, at no time, more than 50 bacteria per cubic centimeter.

The plans as submitted show a plant capable of producing an excellent water, even if not quite as good as the guarantee calls for, except in cold weather. From the experience in the use of uncovered filters at other localities it is very doubtful whether it would be possible to operate the Newark filters in freezing weather unless they were covered. By a great expenditure and the employment of a large number of men, it would be possible to keep the filters free from ice; but even then there is a chance that, through carelessness, the sand might become frozen and thus necessitate the use of polluted raw water.

It is stated by the designing engineer that a system of 2½-inch pipes will be placed around the edge of each filter and that hot water, heated by the exhaust steam of the engines, will be circulated through them for the purpose of keeping the beds from freezing. It would seem, however, that the heat thus obtained would be entirely inadequate for the purpose. A similar arrangement was tried at Indianapolis, Indiana, and proved a failure.

The total cost of the works, including the distribution system, will probably be \$500,000 or \$600,000. A bond issue of \$300,000 has already been voted by the people. This may be expended either on the filtration plant or the distribution system, or both. It is highly desirable that a part of this \$300,000 be used for the construction of the filtration plant as more money is not yet assured.

The Board, on July 22, 1905, approved these plans for proposed new water supply, water filtration plant and distribution system for the city of

Newark, made by Lewis K. Davis, consulting engineer, of Pittsburg, Pa., and submitted to the Board on July 18, 1905; provided:

First—That the slow sand filters be covered with a substantial roof.

Second—That the filtration plant be included in the construction of the first portion of the proposed work; and,

Third—That any change in the operation of the plant be made when required by the State Board of Health.

The plans approved in brief, provided:

(a) For the use of the water from the north branch of the Licking River to be taken at a point about one-fourth mile above the present waterworks.

(b) For the purification of this water by slow sand filtration with preliminary rapid filtration through broken stone and sponge clippings, together with the use of alum to obtain coagulation at times when the high turbidity of the river renders this necessary; and,

(c) For a distribution system consisting of about 20 miles of water mains into which the water is to be pumped continuously.

In September, 1905, the board of public service asked permission to amend these plans, approved July 27, 1905, so that the new intake, and also the entire filter plant, would be located on land adjacent to the west bank of the north fork of Licking River at a point about 3,000 feet north of the northerly corporation line of the city of Newark, instead of above the Newark Water Company's works, as first proposed.

Their reasons for asking permission to make this change were:

First—That there would be considerable saving in length of force, main and intake pipe; and,

Second—That the topography of the ground at the new proposed location was better adapted for building a filter plant.

The engineer of the Board reported that there were few, if any, houses located near the stream between the point for the intake already approved and the point proposed, and that both points were over a mile from the built-up portion of the city. He stated that the only possible objection to placing the intake at the lower point would be that the Newark Water Company would, when their filters were working, discharge washings from their filters into the stream and these washings would possibly make the water at the city plant a little more difficult to purify; though this objection was not important enough to make disapproval of the proposed amendment necessary.

The Board, therefore, approved the proposed amendment September 11, 1905.

REPORT ON PROPOSED WATER SUPPLY FOR PERRYSBURG.

On September 18, 1905, the Riggs and Sherman Company, of Toledo, consulting engineers for the village of Perrysburg, submitted plans and descriptions of a proposed water supply for that village. Perrysburg was visited by the engineer of the Board on October 6, 1905, and the following report was made:

Perrysburg is a village of about 1,750 population, located in Lucas County and adjoining the southeasterly bank of the Maumee River, about nine miles southwest of Toledo. It covers an area of 1.4 square miles.

There is at present no public water supply in the village and water for domestic use is obtained exclusively from private wells. There are at present a few short lengths of pipe and brick sewers which discharge into the nearest convenient gully or water course. These sewers may be used to some extent for domestic purposes. A sanitary sewerage system, covering the entire village has been designed; but no steps have been taken towards its construction. The sewage is to be purified when this system is built.

It is proposed to obtain a public water supply from a subterranean filter gallery, to be constructed in the bottom lands lying between the river and the high land upon which the village is located. The point selected for the location of this gallery is about 400 feet from the river and 1,200 feet from the edge of the high land which is also the approximate boundary of the built up portion of the village. The nearest house to the proposed location of the gallery is 1,500 feet distant, and is situated upon land which probably does not drain toward the proposed site. Between the proposed location and the village is a natural gully or ditch which would effectually cut off surface drainage coming from the village.

It is difficult to predict to what extent the gallery will be supplied with the river water filtered through the ground and to what extent with water from the land side. It is probable that the future supply will consist largely of ground water from the land side but that it will be influenced at times by the river water. The most probable direction from which the ground water will flow, judging from the topography of the ground, will be from the south or southwest. There are no houses or possible sources of pollution in this direction within nearly a half mile except a rubbish dump which is to be cleaned up and the use of the land for this purpose prohibited. An intermittent stream or gully, called Crooked Creek, which receives a considerable portion of the present drainage of the village, flows in a westerly direction about one-half mile south of the proposed site and enters the Maumee River. The valley of this small creek has been suggested as a possible site for future sewage purification works. Considering the high ridge which is located between

this small creek and the proposed waterworks site, also the distance and the character of the soil between these two points, it seems that no pollution to the water supply could come from the valley of this creek, even if a sewage plant, as suggested, were located therein.

A test well, 4 by 6 and 15 feet deep has been dug on the proposed site and enclosed by sheet piling. This well was dug through 6 feet of loam and 9 feet of a mixture of sand, gravel and small stone from which stratum the water is obtained. In order to test the available quantity, this well was pumped with a large diaphragm pump at the rate of about 2,500 gallons per hour, without lowering the level of the water in the well.

The proposed subterranean gallery or reservoir will be of brick or concrete masonry and will be 100 feet long, 14 feet wide and 10 feet deep, resting on bed rock. The gallery walls will be pierced with 1½-inch holes, at frequent intervals, and will be backed with 12 inches of broken stone, between which stone and the natural gravel stratum, as above described, is to be a 12-inch layer of coarse gravel.

The gallery will be located on a site now owned by the village and intended for a street. It is not the intention of the village officials to purchase any more land at this time as the low elevation of the ground in the vicinity of the proposed site will prevent its being used for habitation.

The Maumee River, though receiving more or less pollution, cannot under the construction proposed enter the water system directly but only, if at all, after filtration through several hundred feet of sand and gravel which would undoubtedly render the river water safe even if it were more highly polluted than is the case.

The water from the filter gallery will flow through a 12-inch conduit about 1,000 feet long to the proposed pumping station to be located at the edge of the village. From this pumping station the water will be raised into a 40,000 gallon steel tank, 100 feet high, which will give pressure over the village of about 40 pounds. The number of miles of distributing mains to be laid at present is 3½. It has not yet been decided whether meters will be used. The number of people who will probably use the public supply is estimated at 1,000, and the works are designed to supply a future population of 5,000.

Samples of water have been collected from the test well and although the analysis of the first sample indicates a water not desirable for a public supply, the second sample, collected after further pumping, showed a quite satisfactory water. The first sample had evidently been contaminated in collecting. (For analysis of this water see laboratory report on water supplies.)

Considering the excellent location for the filtering gallery and the desirable character of the water, as indicated by the analysis, there appears to be no reason why this proposed supply should not be approved.

October 16, 1905, the Board approved the plans, as shown upon drawings submitted by The Riggs and Sherman Company on September 18, 1905, provided that no source of pollution, which in the opinion of the State Board of Health would affect the quality of the public water supply, be allowed within 500 feet of any point from which water is taken from the ground.

REPORT ON PROPOSED WATER SUPPLY FOR PRAIRIE DEPOT (FREEPORT, WOOD COUNTY).

In response to a verbal request from the mayor of Prairie Depot, the engineer visited that village on March 30, 1906, to inspect the public water supply. The waterworks were installed in the fall of 1902 and have been in use ever since; although, through some misunderstanding, they have never been approved by the State Board of Health. The following report was made:

The incorporated village of Prairie Depot, the legal name for which is Freeport, is located near the eastern edge of Wood County. The population is about 800.

The public water supply is derived from a driven well, 233 feet deep, located at the northeasterly edge of the built-up portion of the village. The well first passes through strata of clay, sand and gravel, having a total thickness of about 50 feet, although the thickness of each could not be determined. This upper portion (50 feet) of the well consists of a 6-inch or 8-inch iron pipe. The remaining 183 feet of the well is in lime rock from which the supply is derived.

The nearest point where this lime rock appears at the surface of the ground is at Bradner, two miles distant. Within 500 feet of the well there are about 16 houses, all of which dispose of their waste by the usual dry vault and cesspool methods. The nearest of these houses is 80 feet from the well. The 50 feet of clay, sand and gravel probably affords sufficient protection against any pollution from the village, at least for many years to come. It is said that pumping from the well has not affected the level of the water in private wells near it. This fact, however, should not be taken as significant, as comparatively little water is used for the public supply.

The water is raised from the well by means of power furnished by a gas engine, located in a neat pumping station, and forced into an 80,000 gallon standpipe. As there are only about 250 people using the public water supply as yet, and as the daily consumption is only about 15,000 gallons, this stand pipe holds about five days supply.

A sample of the water was collected, after several hours continuous pumping, and was sent to the laboratory for analysis. The results show

the water to be quite safe and also of fairly good physical character. The water is said to have given satisfaction to those who are using it in the village. (For analysis of this water see the laboratory report on water supplies.)

This report, with the plans, was presented to the Board at its meeting held April 26, 1905, and the supply, derived from a well 233 feet deep and located in the northeasterly part of the village of Prairie Depot (Freeport) was approved as a public water supply for the village.

REPORT ON PROPOSED WATER SUPPLY FOR STRUTHERS.

November 7, 1905, application was made by Mr. James J. McNally, secretary of the Mahoning Valley Water Company, for approval of plans for a proposed water supply for Struthers, which plans had already been informally left at the office of the State Board of Health by an officer of the company. The standard blank containing information required in regard to this proposed water supply accompanied the application. In anticipation of these plans being submitted, the engineer visited Struthers on August 4, 1905, and thoroughly inspected the watershed of Yellow Creek and other features relating to the proposed supply. The following report was made:

The Mahoning Valley Water Company, recently organized by certain business men of Youngstown, proposes to create a large storage reservoir, by impounding Yellow Creek, in order to supply the village of Struthers, and also several steel plants and railroads along the Mahoning Valley in this vicinity, with water.

The village of Struthers is located upon the Mahoning River in the northeasterly portion of Mahoning County, about five miles south of the center of the city of Youngstown. The present population is about 3,500. There is no public water supply and the people depend entirely upon private wells and cisterns for water.

Yellow Creek, which drains an area south of the Mahoning River and immediately east of the Pennsylvania state line, discharges into the Mahoning River at the village of Struthers. It is proposed to construct a dam across the creek at a point about a mile from its mouth. This is to be a masonry dam, about 60 feet high. It will hold the water back in an abrupt natural depression formed by the sides of the valley. The reservoir thus created will be about 100 acres in area and will hold 650,000,000 gallons. The average depth will be 30 feet, with a maximum of 60 feet. The bottom and sides of the reservoir will be stripped of all vegetable growth so that only gravel and rock will come in contact with the water. The water will be drawn off through a gate house near the dam and delivered to the village of Struthers and to other consumers by gravity.

It is difficult at this time to form an accurate estimate of the probable amount of water which will be used from the reservoir. It is certain, however, that the proposed reservoir will hold enough to supply the village of Struthers with its present population, many times over.

The watershed of the Yellow Creek above the proposed reservoir has an area of 30 square miles, consisting principally of rolling farm land. The total population of the watershed is estimated at about 1,500 persons, most of whom live in isolated houses. This means an average population of 50 per square mile, which may be considered fairly small. The only community upon the watershed is the village of Poland, which has a population of 390. This village is located directly on the main stream about a mile above the upper end of the proposed reservoir. At this village there are no domestic sewers, although there are one or two storm sewers which discharge into the river. Cess pools and privy vaults are used at each individual residence and several of the latter are suspiciously near the stream.

Some of the houses upon the watershed are located near small ditches, or feeders, and the conditions are such that at times of heavy rains a certain amount of pollution would probably be washed into the river through them. There is also a cemetery, covering an area of about five acres, about a mile and a half above the proposed reservoir, the surface wash from which enters the creek.

From the above it is evident that the watershed of Yellow Creek above the proposed reservoir receives only a small amount of pollution, if any, continuously. There are several opportunities, however, as is the case with nearly every surface water supply, for pollution to be washed into the stream under certain conditions. The water company proposes to obtain the enforcement of a set of rules and regulations for the purpose of protecting the water supply.

The large storage capacity of this reservoir will be an aid in removing any pollution which may be discharged into the stream above, before the water reaches the consumers. This reservoir will also aid materially in clarifying the water when the latter is turbid. With excessive floods it is probable that this reservoir will be filled with turbid water, more or less polluted, unless great care is taken to protect the supply, and that at such times the water will not be wholly desirable; although, with the amount of water which will probably be consumed in the near future, a very long period of sedimentation will be obtained.

November 15, 1905, the Board approved the plans for the proposed water supply for the village of Struthers and nearby factories and railroads, as shown upon drawings submitted on November 7, 1905, by Mr. James J. McNally, secretary of the Mahoning Valley Water Company, and as described by the application accompanying these plans, provided:

First—That the board of trustees of public affairs of the village of Struthers adopt rules and regulations for the protection of the purity

of water in the proposed reservoir; such rules and regulations to be satisfactory to the State Board of Health and similar to those already compiled by the State Board of Health for certain villages in Ohio.

Second—That the Mahoning Valley Water Company employ an inspector, whose duty it shall be to inspect the watershed of the reservoir, at least every month and note, and so far as possible correct, any violation of said rules and regulations, and also note all cases of typhoid fever and other intestinal diseases existing upon the watershed; and in every case where such disease is found to exist that special care be taken to prevent any possibility of excrement from the patient reaching any water course leading to Yellow Creek.

Third—That said inspector report immediately to the board of trustees of public affairs of Struthers, with request for legal action, any case where willful or continued failure to comply with the said rules and regulations exist; and,

Fourth—That the Mahoning Valley Water Company install a filtration plant, satisfactory to the State Board of Health, to purify at least that portion of the supply which is used for domestic purposes, whenever in the opinion of said Board this becomes necessary.

REPORT ON PROPOSED WATER PURIFICATION AT SHELBY.

On August 2, 1905, plans for a proposed water purification system for the Shelby water supply were submitted by Mr. J. C. Fish, superintendent of the Shelby Water Company. These plans were examined by the engineer of the Board and the following report was made:

The village of Shelby has an estimated population of about 5,000 and is located in Richland County, on Blackfork Creek, a tributary of the Muskingum River.

The public water supply was installed by the Shelby Water Company in 1897 and has cost to date about \$116,000. The supply is derived from 12 6-inch wells about 50 feet deep and located in low land northeast of the village, bordering on Blackfork Creek. The wells pass through clay, sand, gravel, blue clay and into a stratum of gravel in which the water is found. The normal level of the water in the wells is 5 feet below the surface and it is said that this level has seldom decreased more than a foot by continued pumping. The creek at times overflows the land upon which the wells are located but this apparently does not change the character of the well water.

The franchise which was granted by the village to the water company contains the following clause relating to the quality of the water:

"It shall be good potable water, free from all obnoxious and injurious elements and be procured from such suitable place as will guarantee its purity and the source shall be protected from future encroachments and pollution. Surface water shall not be used."

The water is pumped from the wells to a standpipe 16 feet in diameter and 145 feet high; having a capacity of 118,000 gallons. This standpipe forces the water into the distribution system with a pressure of about 60 pounds per square inch.

According to the last annual report of the water company to the State Board of Health, there are in the distribution system over 12 miles of mains and 721 services in place; although only 521 are now being used. Less than one-third of the total population is supplied with water. Nearly all of those supplied use the water for drinking as well as other purposes. The average daily consumption of water during the past year has been 800,000 gallons; about 500,000 gallons of which has been used by factories and railroads. Past analyses have shown the water to be safe for use, although containing some evidence of past pollution. The principal objection to the water has been the large amount of iron which it has contained. This iron amounts to about 1.7 parts per million, and has been very objectionable in discoloring plumbing fixtures wherever it is used.

It is now proposed to remove a large portion of the iron before the water is delivered to consumers. To this end an inner cylinder is to be placed within the present standpipe. This cylinder is about 5 feet in diameter and is to reach nearly to the top of the present standpipe. The water on being pumped from the wells is to be impregnated with air by means of an air compressor. It is then to be discharged through a vertical supply pipe into the top of the inner cylinder. As the water descends through this cylinder it rolls over baffle plates, which action causes thorough aeration of the water and precipitation of the oxidized iron. Near the bottom of the inner cylinder the water is to be drawn off into two horizontal pressure filters and filtered through cork. It is then to be again raised to the top of the standpipe, but this time discharged into the annular space between the sides of the present standpipe and the proposed inner cylinder. From here the water will be distributed into the mains as under present conditions.

Direct connections are provided so that the filters may be cut out if necessary and even the standpipe itself cut out in case it is wished to force the water directly from the wells into the mains. The plans as submitted do not call for the introduction of anything into the water except air. The proposed improvement will cost from \$15,000 to \$20,000.

There appears to be no way in which the water can deteriorate by this treatment while it seems probable that the removal of, at least, a considerable portion of the iron will be effected.

August 7, 1905, the Board approved the plans for the purification of

the water supply of Shelby, providing for the removal of iron by a process of aeration and subsequent filtration through cork.

REPORT ON PROPOSED WATER FILTRATION FOR TOLEDO.

At a meeting of the State Board of Health held January 26, 1905, plans of proposed water filtration for the city of Toledo were presented by the city engineer and other city officials. The Board moved to refer the plans to a committee of three, consisting of the resident member, the secretary and the engineer. This committee reported as follows:

On February 2, 1905, the resident member and the engineer met the board of public service and other officials of Toledo, and visited the site proposed for the filtration plant. This site is located about a mile south of the city limits, on high land adjacent to Maumee River. It contains about 31 acres. The water will be taken from the river through a new intake opposite the site.

The proposed work is described in a general way by the drawings and report submitted by the city officials. The principal features are as follows:

1. A new intake and conduit to pump well.
2. Pump well and pump house.
3. Low service pumping machinery.
4. Rising mains to purification plant.
5. Discharge well and connections.
6. Devices for the addition of coagulants to the water.
7. Coagulating and subsiding basins.
8. Filters and appurtenances.
9. Clear water conduits from filters.
10. Clear water storage basins.
11. Main drain from plant.
12. Conduit from plant to high service pumping station.
13. Compensating reservoir.
14. Connections at pumping station.

The plant will have a nominal capacity of 20,000,000 gallons for 24 hours, though certain parts of the plant will be designed to be used with a future enlarged plant with a capacity of 60,000,000 gallons.

The filters will be 20 in number, each having a capacity of 1,000,000 gallons per 24 hours. The filters will be of concrete construction and provided with the most approved devices for operating.

The plans provide for two clear, or filtered water reservoirs, one at the site of the filtration works and the other at the site of the present pumping station. Together these reservoirs will hold 10,000,000 gallons, or 12 hours supply when the plant is treating 20,000,000 gallons per day.

This will enable the filters to be operated at the same rate at all times. Further storage for the filtered water is provided by the present water-works standpipe.

The drawings and report of the city engineer and consulting engineer, as submitted to the State Board of Health, though very general in character, are in accordance with good practice so far as they cover the problem.

This report was referred to the Board and February 10, 1905, it was voted to approve the plans presented January 26, 1905, subject to the following provisions:

First—That all details relating to the construction of the plant, kind of coagulant to be used, and methods of operating, be submitted to the State Board of Health for its approval before the plant be constructed.

Second—That a laboratory be established at the filtration works and that analyses of the raw and filtered water be made daily, and oftener during the high stages of the river when the character of the raw water is likely to change suddenly.

Third—That in the operation of the plant a degree of efficiency shall be maintained at all times satisfactory to the State Board of Health.

It was suggested further that in the filtration of turbid water it is very desirable to allow a certain amount of preliminary subsidence of the water before the coagulant is introduced, and the Board advised that in making details of the plant the wisdom of providing for such preliminary subsidence be carefully considered.

October 23, 1905, Mr. Charles L. Parmelee, consulting engineer for the city of Toledo, submitted complete plans and specifications for the proposed filtration plant.

These were referred to the engineer of the Board and the following report was made:

In accordance with the first provision of the approval of the general plans, given February 10, 1905, full detailed plans are now submitted. The plans and specifications for the general scheme or "lay-out" of the plant were made under the direction of the city engineer and the consulting engineer, and include all subsidence and coagulation and clear water basins, chemical tanks, apparatus for introducing the coagulant, foundations and superstructure of filter house, and all main conduits and pipes except those which are distinctly a part of the filtering apparatus. These features are all in accordance with the plans already approved. The design of the filters proper (or method of purification) has been left to the contractor and the general specifications contain the following relating to this feature:

"No method will be considered, or system accepted, which involves the use of poisonous or dangerous chemicals, or which will cause an objectionable condition of the water from a commercial or hygienic standpoint, and no contract will be awarded unless the proposed method

is approved by the State Board of Health of Ohio. Among other conditions the water after purification must be at least equal in quality to the following:

"Bacteria in purified water shall not be over 70 per cubic centimeter when the raw water contains less than 3,500 bacteria per cubic centimeter.

"Bacteria in purified water shall not be more than two (2) per cent. of the number in the raw water when the latter contains more than 3,500 per cubic centimeter.

"Suspended matter in purified water shall not exceed three (3) parts per million.

"The purified water shall not contain any more color, iron, chlorine or other deleterious compounds than the raw water.

"The purified water shall not contain any free caustic lime or soda, or any free acid, or any undecomposed sulphate, or chloride of iron or aluminum."

The contractor to whom the entire work, including the filters proper, has been awarded, subject to the approval of the State Board of Health, is the Norwood Engineering Company, of Florence, Mass. Plans of the filters proper or filtering apparatus, designed by this company, are included with the other detailed plans submitted. In order to determine whether or not the contractor is fulfilling his guarantee, the first year's operation will be under the direction of the consulting engineer, and both during and after that time, provision will be made by the city for continuous expert supervision.

In accordance with part of the second provision of the approval given February 10, 1905, a well equipped laboratory has been provided for.

The plans now presented contain no essential principles different from those in the general scheme already approved. Since then the details relating to the construction of the plant have been thoroughly worked out, however, and the construction of the filtering apparatus definitely determined.

The plant is to have an immediate capacity of 20,000,000 gallons per day; but certain devices will be so designed that it can be economically increased to a 60,000,000 gallon capacity. The present daily consumption is 12,000,000 gallons. It is intended to use both sulphate of alumina and sulphate of iron with lime, as coagulants, and to determine by thorough studies which gives the better results. Mixing tanks, and other apparatus, for preparing and introducing either coagulant, have been provided.

In accordance with the advice offered by the Board in its letter of approval of the general plans, provision has been made for obtaining a certain amount of sedimentation before the coagulant is introduced; the subsidence and coagulation basins being so arranged that the coagulant may be injected at one of several different points, thus giving almost any

period of coagulation desired, as the character of the water changes. There are two of these basins, each holding 5,000,000 gallons; thus affording a combined capacity of 12 hours sedimentation when the output of the plant is 20,000,000 gallons per day. It is intended to use these basins, however, until the whole plant is increased to 30,000,000 gallons capacity; at which time they will provide 8 hours sedimentation.

From the subsidence and coagulation basins the coagulated water will flow to the filters. These are 20 in number, each 16 by 22½ feet, arranged in two parallel rows in one wing of the filter house. Between the two rows of filters is the operating floor, beneath which is a gallery containing the necessary clear water conduits, drains and other piping.

The water will be distributed on to each filter through two lines of gutters, of special form, extending longitudinally over each filter about three feet from the side walls. The special feature of these gutters is that there is a projecting rim on each side in order to prevent any sand from being washed away when the filter is being cleaned.

The water passes downward through 2½ feet of Mount Tom sand specified as follows:

"The effective size of the sand shall not be less than 0.35 mm. nor more than 0.40 mm. The uniformity coefficient shall not be more than 1.50. The specific gravity shall not exceed 2.65.

"The sand shall be practically pure quartz and shall not contain more than one and one-half (1½) per cent. of calcium oxide, magnesium oxide, mica, slate, coal and other foreign mineral compounds measured collectively, nor more than one-half (½) of one (1) per cent. of loam, clay and dust. Bank sand or material from the Maumee River will not be accepted. Bank sand in general will require excessive washings.

"Sand layers will be thoroughly washed after placing and the upper one (1) inch shall then be removed and the layer made up to the required thickness with new material. This operation will be repeated three (3) times."

Beneath the sand will be 9 inches of gravel, described as follows:

"The filter gravel will be nine (9) inches in depth of three different sizes. The first size will pass through a ¾-inch screen and stop on ½-inch; the second size will pass through a ½-inch screen and stop on ¼-inch; and the third size will pass through a ¼-inch screen and stop on 1-16-inch."

Each filter will be equipped with the standard strainer system made by the Norwood Engineering Company, and found by actual use to be very satisfactory. This strainer system consists of a central gutter, extending the length of the filter at the center of the bottom, into which are screwed, at intervals of 10 inches, lateral pipes 2 inches in diameter, extending out to the side walls. Into these lateral pipes are inserted, every six inches, brass strainer tubes, each 6 inches long and ½-inch in diameter, and provided with a large number of narrow slots. There

will be from 800 to 900 of these brass tubes in each filter. The total area of these slotted openings will be great enough to allow the water to pass through them, when filtering at the rate of not over one foot per second.

The outlet of each filter will be provided with an effluent controller, detailed drawings of which are submitted. This type of controller has been thoroughly tested and is quite reliable. By means of this device the rate of filtration will be kept fairly constant between the time that the filter has just been washed and the time when washing is again necessary. It is possible, however, to adjust or change these controllers by means of a valve so that the rate of filtration will be greater than the proposed rate of 128,000,000 gallons per acre per day. There would be no necessity for doing this except at times of fire, however, and this is a feature which must be taken care of by faithful and competent management.

A clear water, covered, concrete reservoir, holding 5,000,000 gallons, is provided for and will be built immediately. This reservoir, when the plant is treating 20,000,000 gallons per day, will hold an average of 6 hours flow. It is the intention to build another reservoir as soon as practicable, at the pumping station. It would be very desirable to have this second reservoir in order to guard against the necessity of having to operate the filters at an excessive rate at times of fire.

For washing purposes, each filter is to be equipped with a separate system of air piping covering the entire area of the filter and through which air is to be forced into the bottom of the filtering material, just below the sand. The use of this system, together with the specially designed overflow trough described above, will enable the water and air to be used simultaneously, instead of alternately as is the general practice. It is claimed that much more effective washing can be obtained in this way.

The arrangement of the piping and conduits for conveying the water to and from the filters is very commendable. All valves are easily accessible from the gallery beneath the operating floor and there is no possible chance of allowing raw water to come in contact with the filtered water. The outlet of each filter is also accessible for obtaining samples of water. Each filter will be controlled by hydraulic valves moved from a table on the operating floor, as is done in several of the best plants now in use.

This report was presented to the Board at a meeting held October 25, 1905, and the detailed plans and specifications, submitted by Mr. Charles L. Parmelee, consulting engineer, October 23, 1905, were approved, provided that the conditions of approval, already given, of the general plans be made a part of this approval, to-wit:

That a laboratory be established at the filtration works and that analyses of the raw and filtered water be made daily, and oftener during the high stages of the river when the character of the raw water is likely

to change suddenly; and, that in the operation of the plant a degree of efficiency shall be maintained at all times satisfactory to the State Board of Health.

The Board further advised that it would be highly desirable to provide, at the earliest time practicable, a greater storage capacity for the filtered water.

REPORT OF AN INVESTIGATION OF THE WATER SUPPLY OF A TUBE MILL AT ZANESVILLE.

Complaint having been made by the board of health of Zanesville, as to the water supply of a tube mill in that city, the matter was referred to the resident member of the Board for investigation and he reported as follows:

On February 10, at the request of the secretary, I investigated the water supply of the tube mill at Zanesville. The complaints were based upon the existence of a few cases of typhoid fever among the six hundred or more employes of the works and the belief, or at any rate a suspicion, that the water was not wholesome.

I was shown through the mill and about the premises by Mr. Mark, the proprietor. I found conditions about as follows: The mill has its own water supply for both manufacturing and drinking purposes. The water is obtained direct from the river for manufacturing purposes, and that water supply is intended to be used only for manufacturing purposes. I found very few places in the mill where this water could be used for drinking purposes, and did not see anywhere drinking cups as an evidence that this water was being used for drinking purposes. The water used for drinking is obtained from a driven well, which is not exposed to any source of pollution. The water from the well is supplied to the workmen by carriers. There are two other driven wells near the river which furnish the water supply for probably twenty families occupying the houses which are the property of the mill people. It is not probable that this well water is unwholesome. The river water is, of course, unwholesome water as it receives the sewage from the city, the mill being located, as I omitted to state, just south of the city limits. It is probable that occasionally some of the men do drink the water distributed through the mill and intended to be used solely for manufacturing purposes, but I saw well water in buckets at different places throughout the mill, and the management tell me it is their aim to have that water used for drinking. Mr. Mark suggested that he would have notices posted throughout the mill warning employes to drink no other than the well water which is supplied by carriers. I am quite certain the management have due regard for the health and general welfare of their employes, as I see ample

evidence of improvement in the general sanitary conditions in and about the plant.

If conditions should grow worse or at any time justify it, I would suggest an analysis of the water from these wells.

A copy of this report was sent to each member of the State Board of Health and to the health officer of Zanesville February 11, 1905.

SEWERAGE AND SEWAGE DISPOSAL

REPORT ON PROPOSED SEWAGE PURIFICATION FOR THE TUBERCULOSIS HOSPITAL OF THE CLEVELAND FARM COLONY AT WARRENSVILLE.

November 7, 1905, plans for a sewage purification plant for the tuberculosis hospital for the Cleveland Farm Colony, located at Warrensville, were submitted by A. J. Galvin, assistant city engineer, to the State Board of Health for approval. Previous to that date, the engineer of the Board had two conferences with the designing engineer in reference to the plans, and the following report was made:

The tuberculosis hospital belonging to the city of Cleveland is located at Warrensville, some ten miles southeast of the center of the city of Cleveland. The hospital, it is understood, is at present about completed and it is expected that it will be occupied before long by from one hundred to one hundred and twenty-five persons. This population, therefore, has been used as a basis in designing the sewage purification works. It is expected that the daily yield per person will be from 50 to 60 gallons, which means a total amount of about 6,000 gallons per day.

The sewage from the hospital will all be discharged into a 6-inch sewer leading to the purification works, to be located at least 600 feet from the nearest building.

On arriving at the works the sewage is to be first passed into a screen chamber, about 2 feet by 4 feet in plan, in order that the larger solid particles in the sewage may be removed. The accumulation on the screen will be removed every few days and thrown out upon the ground to dry, or it will be burned beneath the boilers, whichever is found to be most satisfactory, later. It is stated by the health officer of Cleveland that regulations will be enforced at the hospital whereby all sputum and infected excreta from the tuberculous patients will be sterilized before being discharged into the sewers; or such substances will be otherwise disposed of. The accumulation upon the screens, therefore, even if allowed to dry upon the ground, would probably not be the cause of spreading tuberculosis germs. As a safeguard, however, actual tests of this material will be made, after the plant is in operation, in order to make it positive that tuberculosis germs are not present.

From the screen chamber the sewage flows into a septic tank, 7 feet by 9 feet in plan, and 5 feet deep below the inlet. The tank will be provided with baffle boards in order to cause an equal velocity of flow across the width of the tank. The sewage will be drawn off from a point about 2 feet below the surface and pass through a 6-inch pipe into the dosing tank.

The dosing tank is 8 feet square and is to be provided with a 5-inch automatic syphon which will discharge the entire contents of the tank on to the sand filters when the sewage has reached a depth of 2 feet.

These sand filters are four in number, each 24 feet by 30 feet at the bottom and 30 feet by 36 feet at the top, thus giving a total "effective" area of 0.85 of an acre. This provides, with a population of 125 persons, for a rate of filtration of about 75,000 gallons per acre per day; a liberal provision.

The filters are to be filled with 3 feet of sand to be obtained from a bank in the neighborhood. A sample of this sand has been inspected and found to be quite satisfactory for the purpose. The filtering material is to be underdrained by three lines of 4-inch tile leading into two main 6-inch tiles which in turn connect with an outfall drain leading to a small intermittent brook or ditch. The material between the underdrains and sand will be properly graded, so as to obtain proper filtration and also to prevent the washing away of any sand. The slopes around the tops of the filter beds are to be sodded or cemented in order to prevent any soil or clay from being washed on to the filters.

The discharge pipe from the dosing tank is to lead into a distributing flume from which the sewage, by means of wooden gates, can be distributed on to any one of the beds. When one bed has received the contents of the flush tank the sewage will be directed upon another bed by the attendant. By installing certain apparatus, a large part of the labor of directing the sewage from one bed to another could be saved, but it is stated that there will be plenty of patients at the hospital who can be used for this work; and it is thought that the plant will receive more careful attention if it is constantly visited, as is necessary under the method of operation proposed.

Adjacent to the septic tank is to be a sludge bed, 9 feet by 12 feet in area, containing two or three feet of sand enclosed by a brick wall and underdrained in a similar manner to the filters. The underdrains of this sludge bed are connected with the main outfall underdrain of the plant. When the accumulation in the septic tank makes cleaning necessary, the sludge will be pumped on to the sludge bed and thoroughly filtered. The filter will then be allowed to dry and the dried sludge scraped off and burned or composted. This will prevent any pollution of the stream by sludge, as has been the case in several small plants of this character in the past.

November 13, 1905, the Board approved the plans, as shown upon a drawing dated October 26, 1905, and submitted by Mr. A. J. Galvin, assistant engineer, sewers and drains, department of public service of Cleveland, on November 7, 1905; provided that the size of this plant be increased as deemed necessary by the State Board of Health and that the methods of operation be at all times subject to the approval of this Board.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION WORKS FOR CHICAGO.

Plans for sewerage and sewage purification for the village of Chicago were submitted July 10, 1905, by Mr. W. J. Sherman of the firm of The Riggs and Sherman Company, consulting engineers of Toledo. Chicago was visited by the engineer of the Board on the 15th of July and the following report was made:

Chicago, commonly called Chicago Junction, is a village of about 2,500 inhabitants, located in the southwesterly corner of Huron County. This village is on the watershed of the Huron River but there is no stream of any considerable size near it. The total area of the village is .89 of a square mile, nearly all of which is platted and about half of which is built up.

At present there are but few sewers. These are designed for storm sewers but are used to some extent for sanitary purposes. Passing through the southerly part of the town are two ditches, each about one-half mile long, which receive sewage or sink drainage from a considerable number of houses. One of these ditches and also one of the existing storm sewers, discharge into a stagnant pool of water known as the B. & O. Railroad reservoir and located near the center of the town. The need of proper sewerage in the village is great.

The plans as presented provide for 11 miles of domestic sewers and sewage purification works; and also for more than a mile of storm sewers. The latter will discharge into various ditches, all leading eventually to the Huron River. One of these storm sewers is to take the flow of one of the present open ditches. It cannot be stated at this time just how many miles of sewers will be built in the immediate future but it is probable that not more than three or four miles will be built.

The domestic sewage of the entire town will be collected at one point, in the northwesterly part of the corporation and discharge at sewage purification works. The main sewer leading to the works will be 24 inches in diameter. The location proposed for the works is a thickly wooded valley through which a small stream passes. This stream is the overflow from a spring in the western part of the village, and is very small in volume. About eight miles below Chicago it enters the Huron River. Neither the river nor this tributary is used for public water supply purposes but both are probably used to a large extent for stock watering.

The nearest house to the proposed site is near the corner of Hayes and Second streets and is some 600 feet distant. The edge of the built-up portion of the village is about 1,000 feet away. By clearing the land as little as possible when the plant is built, it would be impossible to see it from any of the village streets or houses.

It is estimated by the consulting engineers that within a period of five years the average daily flow of sewage from the village will be about 100,000 gallons; and that the sewers will be used by 1,500 persons. This estimate is very liberal. The sewer system is designed to take care of over a million gallons per day.

The sewers are to be ventilated through the soil pipe of each house connected.

The plans for sewage purification works provide for a grit chamber 10 feet by 21 feet and about 7 feet deep. The outflow sewer from the village is to discharge into this grit chamber through a screen having bars $\frac{1}{4}$ -inch by $1\frac{1}{2}$ inches, spaced 1 inch center to center. The grit chamber is to be so constructed that it may be easily drained.

From the grit chamber the sewage will pass into two covered septic tanks, each 10 feet by 70 feet, with an average depth of $7\frac{1}{2}$ feet and having a combined capacity of 80,000 gallons, or about twenty hours flow, with the estimated discharge (at the end of 5 years) of 100,000 gallons. Both septic tanks and grit chamber can be drained on to two sludge beds, each 24 feet square and containing 18 inches of fine gravel. There is a by-pass through which the sludge from the grit chamber may be passed, in case of emergency, directly to the creek, or through which the entire flow of sewage can be passed to the creek. The sludge from the septic tank, however, must be filtered through the sludge beds before reaching the creek and with the usual operation, the grit chamber sludge will also be applied to the sludge beds.

From the septic tank the sewage will pass into an automatic dosing tank with six different outlets, each discharging upon a sand bed. For operating this dosing tank, approval is asked of two different systems, only one of which will, of course, be used. With one system the capacity of the dosing tank is about 5,000 gallons and the tank is discharged automatically through each outlet in turn by siphonic apparatus; with the other system, the capacity of the tank is about 1,000 gallons and it is discharged automatically through each outlet in turn, by means of ordinary valves operated by compressed air; the air being compressed by the sewage rising in the tank.

The sand beds are six in number, four of them are 40 feet by 30 feet, and two are 52 feet by 72 feet. Each has an area of about 3,600 square feet, thus giving a total area of about one-half acre. When the average daily flow amounts to 100,000 gallons per day the rate of filtration will be 200,000 gallons per acre per day. It may be desirable to enlarge the beds before this rate is attained.

Each bed is to consist of 12 inches of coarse gravel, 12 inches of fine gravel from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter, and 12 inches of fine sand, and each will be underdrained by three lines of 6-inch pipe leading to a main underdrain, 12 inches in diameter, which discharges into the creek.

These plans, submitted by The Riggs and Sherman Company, of

Toledo, July 10, 1905, were approved by the Board July 21, 1905, provided the sand area be increased when deemed necessary by the State Board of Health. The engineers were also advised that the valve controlling the by-pass leading from the grit chamber into the creek should be closed and sealed by the health officer of Chicago, and that this by-pass should be used only in an emergency and with the knowledge of the health officer; and, that while either system of operating the dosing tank would be satisfactory if properly adjusted and occasionally looked after, the size of the tank should be such that each dose would not exceed 2,000 gallons.

They were also notified that it was understood, from certain members of the village council, that the area of land upon which the purification works was to be located was to be of a size satisfactory to the State Board of Health.

REPORT ON PROPOSED SEWERAGE FOR THE CAPITAL UNIVERSITY, COLUMBUS.

Mr. Samuel Esswein, plumbing contractor for a new building in process of construction at the Capital University, on September 27, 1905, submitted plans of proposed sewer outlet. The location in question was visited by the engineer of the Board October 10, 1905, and the following report was made:

Capital University is an institution located on Main Street about 1,000 feet east of Alum Creek. It is, therefore, just outside of the limits of the city of Columbus. The institution is provided with water from the Columbus waterworks.

There are about one hundred and fifty people, including faculty and students, at this university. The present buildings are not provided with modern plumbing. A privy vault, used by all the occupants of the buildings, is located on the grounds and creates more or less nuisance. Sink drainage is discharged into Alum Creek about 1,000 feet distant, through a 12-inch tile drain.

The building now in process of construction is to contain ten water closets, which are to be used by the occupants of all the buildings; the present privy vault to be abandoned.

It is proposed to discharge these water closets into the present 12-inch tile drain, which was constructed to receive sink drainage only and which discharges into Alum Creek, about 1,000 feet away, at a point about 900 feet south of Main Street and about 500 feet south of a present main city sewer outlet.

In view of the fact that the city now discharges a large quantity of its sewage through the above mentioned outlet in the immediate vicinity

of the outlet of the Capital University drain, the small amount of sewage which would come from the university would be entirely lost sight of in the gross pollution caused by the city's sewage.

It is expected, however, that within a year or two the city will build an intercepting sewer which will cut off this present outlet and convey the sewage to the purification works. When this is done it would be highly desirable that all other minor pollution be removed from Alum Creek.

It is stated that there are at present no funds available which the university authorities can use for sewage purification purposes. All things considered, it would seem that the university should be allowed to discharge sewage into Alum Creek until such time as the city removes its sewage from the stream, but sufficient guarantee should be obtained from the trustees of the university at this time that they will purify the sewage from this institution in the future.

The Board, on October 17, 1905, approved the use of this 12-inch drain, extending from the university to Alum Creek at a point about 900 feet south of Main Street, for a domestic sewer; provided the trustees of the Capital University filed with the Board an agreement, either to install a satisfactory sewage purification plant, or to connect the university sewer with the Columbus sewerage system, whenever in the opinion of the State Board of Health it became necessary to discontinue the discharge of sewage from the university into Alum Creek.

(Such agreement was filed with the Board October 25, 1905.)

REPORT ON PROPOSED SEWAGE DISPOSAL WORKS FOR COLUMBUS.

At a meeting of the Board, held in Toledo on August 16, 1905, general plans for proposed sewage disposal works for the city of Columbus were submitted by Mr. H. O. Pond, president of the board of public service. By action of the State Board of Health these plans were referred to a committee consisting of the president, secretary and engineer. The following report was made:

PAST ACTIONS OF THE BOARD.

On October 31, 1900, the board of sewer commissioners of the city of Columbus presented plans and specifications for additional sewerage and sewage disposal works. The plans for sewage disposal provided for 12 septic tanks of 500,000 gallons capacity each. No filtration or further purification of the effluent from these tanks was proposed. The question of approving these plans was referred to a committee consisting of Doctors Warner, Crossland and Probst, for investigation and report. This com-

mittee visited a large number of sewage purification works in this State and in the East, where septic tanks were in use, and as a result of their inspection and investigation concluded as follows:

First—That there would be a possibility of open septic tanks of the size proposed creating a nuisance.

Second—That the septic tanks alone would not prevent pollution of the river at times of low water.

Third—That the cost of artificial filters necessary to purify the septic tank effluent would be excessive and the life of such filters would be uncertain.

Fourth—That there was a lack of exact scientific knowledge as to the septic tank process under varying conditions and with different sewages.

The committee therefore recommended that the plans for purifying the sewage of Columbus by septic tank treatment be disapproved; and the Board voted to adopt the committee's report. It was also recommended to the city that an experimental plant, with a laboratory, be established for the study of the character of the Columbus sewage and the best manner to purify it.

In June, 1901, the Columbus sewer commissioners presented amended plans to the Board for a system of sewage disposal. Accompanying these plans was the report of Mr. Rudolph Hering (on Sewerage and Sewage Disposal of Columbus). The plans proposed by the commissioners and the consulting engineer provide for 4 settling tanks

"of an individual capacity of 500,000 gallons, operated in pairs, through which all sewage will pass, followed by 16 covered septic tanks of the same size and capacity of the tanks above mentioned, giving, with a normal flow estimated at 20,000,000 gallons per day, a septic treatment of 12 hours. The plan further provides for 80 acres of artificial sand filters and for the treatment of the septic effluent, when necessary, at low stages of the river, at a maximum rate of 250,000 gallons per acre per day."

The plans also contemplated the discharge of a certain amount of septic effluent into the river at all times but at no time was the amount thus discharged to be sufficient to create a nuisance.

The Board voted, July 13, 1901, to approve these plans under the following conditions:

"First—That the sewage disposal plant be fully completed at the earliest time practicable.

"Second—That the area of filter beds be amply sufficient to purify all sewage.

"Third—That in the operation of the plant after its completion raw and practically unpurified sewage shall at no time be discharged into the river in amounts sufficient to create a nuisance."

The Board further voted to recommend to the city that only a sufficient number of tanks be constructed in the beginning in order to de-

termine by further study the number and size of tanks that would be ultimately required.

RECENT PROGRESS IN OBTAINING IMPROVED SEWERAGE.

From the foregoing it will be seen that Columbus was provided in 1901 with suitable plans for disposing of its sewage. The money necessary for carrying out these plans, however, was not provided until November, 1903, when the citizens voted to issue bonds for \$1,200,000 for sewerage and sewage disposal purposes. Before expending any of the money for the disposal works the city officials decided, in accordance with the advice of the State Board of Health, to conduct a series of actual tests upon the best and most economical methods of disposing of the city's sewage. The importance of the problem of purifying the sewage of such a large and rapidly growing city demanded that whatever method adopted should be an assured success, and the great cost of such a work made it decidedly advisable to secure the least expensive method consistent with good results. Investigations into the sewage disposal problem, made in this country and abroad since the Columbus plans were drawn up in 1901, suggested several possible new methods.

Accordingly, a sewage testing station, located near the outlet of the principal intercepting sewer, was constructed in April, 1904, and experimental studies were begun in the following August and continued for one year. A corps of fourteen or fifteen men, nearly all trained engineers, chemists or bacteriologists, was retained to carry on the studies. Some fifty experimental tanks and filters of different types and containing various kinds of filtering material were installed and each was tested during the entire period of one year, or until it was shown that it would not be applicable to the Columbus problem. All these tests were made upon an unusually large scale. A full report of this work will be submitted to the State Board of Health later.

As a result of these tests it has been possible to design, with assurance of success, and with the money available, a sewage disposal plant which will satisfactorily purify Columbus sewage, with its special characteristics, under the local conditions relating to topography, design of sewerage system, site for disposal works and character and flow of the Scioto River, into which the effluent is to be discharged. Plans of this proposed plant, described below, are now before the State Board of Health for approval.

The conducting of experimental studies has not, however, delayed the general project of improved sewerage, for which the bond issue of \$1,200,000 was voted. A large amount of money must be or is being spent in extending or rebuilding the present main sewers in order to enable the sewage to reach the site for the disposal works located below the city. Work in accomplishing this, and also in carrying out such portions of the general scheme as would not be affected by the results ob-

tained at the sewage testing station, has been under way during the past year.

PROPOSED WORK.

The present intercepting sewers now discharge into the Scioto River, one on the east bank and one on the west bank, at a point near the southerly corporation line and about two and one-fourth miles south of the center of the city. A pumping station is now under construction on the west bank of the river near the outlet of the principal West Side intercepting sewer. The East Side intercepting sewer will be extended underneath the river and discharge into the pump well at this station. A new intercepting sanitary sewer for the West Side is now under construction and this will also discharge at the pumping station. In addition, a storm water sewer from the West Side is being constructed adjacent and parallel to the sanitary sewer and this will pass beneath the pumping station and discharge into the river, except in times of extremely high water. At such times the outlet of this storm sewer will be closed and its contents pumped into the river by special pumps provided for this purpose. A second storm water sewer, draining a portion of the West Side, will also discharge through the pumping station and be pumped into the river when necessary. Domestic sewage will also be pumped into the river at this point whenever the high water prevents its treatment at the disposal works. This feature will be discussed more fully further on.

All domestic sewage, on reaching the pumping station, is to be passed through screens having an open space of one-half inch and the screenings, by means of special machinery, are collected and pressed and then burned under the boilers. A considerable portion of the grosser particles of suspended matter in the sewage will therefore be intercepted at this point and the sewage disposal works proper will be relieved of a certain amount of work.

After screening, the sewage is to be forced through a 48-inch main to the proposed sewage disposal works, about one and one-fourth miles south of the pumping station. This force main has already been laid.

The site for the disposal works is a 250 acre tract of land already owned by the city, located along the west bank of the Scioto River and east of Jackson Pike. It is about one and one-fourth to one and three-fourths miles south of the city limits and three and one-half to four miles south of the center of the city. This tract as well as the site for the pumping station and the territory lying between them is to be well protected, by dikes, from the overflow of the river. In addition the sewage disposal plant proper will be completely surrounded by a high dike.

The nearest house to the actual site of the works is nearly one-half mile distant and is owned by the city. There are but four or five houses

within three-fourths of a mile and only about fifteen within a radius of a mile. Considering the character of the land in this vicinity and the fact that the city owns a large portion of it, it is not likely that many more houses will be built within a mile of the plant. It is very improbable, therefore, that any complaints against odors from the plant will ever be made. In any case it is not expected that such odors could be detected more than 1,500 to 2,000 feet away.

The proposed plans as submitted, described in the accompanying application, provide for a plant of 20,000,000 gallons capacity, to treat the sewage in uncovered, concrete septic tanks holding 8,000,000 gallons and to filter the effluent from the tanks through the sprinkling filters of broken stone, 5 feet deep. The filter effluent is to be subjected to about two and one-half hours sedimentation, to remove the larger suspended particles, before discharging it into the river. The plant as proposed for present construction, together with proposed future additions, will cover not more than an area of 30 acres. This area is to be located in the northeasterly corner of the above described 250 acre tract and will be completely surrounded by a high dike, as mentioned above.

Septic Tank Treatment. For immediate construction, the septic tanks are to cover an area 450 feet long and 200 feet wide. The upper portion of this tank area is to be divided into four parallel primary tanks, each covering an area of 150 feet by 50 feet. The remaining space is to be divided by a longitudinal wall into two secondary tanks, each 300 feet by 100 feet. Across the center of each of these secondary tanks is to be a low dividing wall, reaching to within one foot of the surface, and also a scum board. Another scum board is to be placed at the lower end of the secondary tanks.

The sewage from the force main may be discharged into any one or all of the primary tanks, from which it passes over or through openings in the lower dividing wall to the secondary tank. The outlets of the secondary tanks are to be so controlled by a floating weir, or other automatic device, that the discharge from them will always be constant. This will necessitate a fluctuation in the surface of the liquid of from 9 feet minimum to 12 feet maximum depth.

The mean period of flow through the system of septic tanks, based on an average daily flow of 20,000,000 gallons, will be about 8.3 hours. It is expected, with the flexible design of the tank system and with the fluctuating level and constant discharge, that the variation from dry weather flow to storm water flow can be handled with greater advantage than with a constant tank level and variable discharge.

The different tanks are so connected that any one can be cut off for cleaning without interfering with the working of the remainder. The amount of sludge, according to estimate, which will be deposited at the bottom of the septic tank will amount to five and one-half cubic yards per million gallons; and if this sludge is allowed to remain in the tanks

long enough it will be reduced, by bacterial action, to such an extent that the accumulative amount in the tanks will be about two and three-tenths cubic yards per million gallons. According to this and considering the design of the tanks it will be possible to retain the sludge in the tanks for a period of 8 months without accumulating enough to cause a serious, if any, increase in the amount of suspended matter carried out in the tank effluent.

At periods of high water it is intended to drain such of the septic tanks as require cleaning and flush the sludge into the river at a point on the west bank opposite the works. The topography of the site is such, it is claimed, that it will be possible to drain out the septic tanks by gravity only when the water is lower than an 8 or 9 foot stage. The excessive freshets in the river would, therefore, not be available for carrying away the sludge; but the medium high stages only could be utilized. The rate of discharging the sludge will be regulated so that "objectionable conditions will not be produced, and so that the pathogenicity of the river water with which the sludge is diluted will not be greater than under normal conditions when receiving the settled effluent of the sprinkling filters."

Oxidizing Treatment in Filters and in Final Settling Basins. The clarified and partially purified sewage flowing from the septic tanks will be conveyed to a gate house, to be located in the center of the filtering area. This gate house will be a two story structure, the lower floor of which will be used for operating the gates and other devices which control the flow to and from the filters. In the second story of the building will be located the chemical and bacteriological laboratory. Analyses to determine the efficiency of the plant are to be made frequently.

From the gate house the sewage will flow on to the sprinkling filters which are to do the principal work in oxidizing and purifying the sewage. The sprinkling filters are, under immediate construction, to be four in number. Each is to be in the form of an equilateral triangle and cover an area of two and one-half acres, giving a total area of ten acres. These four filters are so placed, with reference to each other, that when the two future proposed filters are constructed, the entire filtering area will form a hexagon, divided into equilateral triangles, with the gate house in the center. The filtering material for these sprinkling filters is to be broken stone, 5 feet deep, underdrained by a hollow or false bottom which is designed to allow free drainage and thorough aeration. The true bottom, as well as the sides of the filters, is to be of concrete.

The sewage will be sprayed over the surface of these filters under a practically constant head (obtained by the regulated septic tank discharge as above described) by means of sprinkling nozzles, which resemble closely the ordinary lawn sprinkler. There will be several hundred of these nozzles arranged, in plan, in the form of a pyramid, to each filter. The sewage reaches the filtering material in a fine spray, and trickles

continuously downward into the underdrainage system, carrying with it the oxygen upon which its purification depends. Each filter can be used for at least several days at a time, before it is necessary to turn off the sewage and aerate the filtering material. Each nozzle will distribute the sewage over an annular area of about 30 square feet; but it is expected that the sewage, after passing below the surface, will spread out to a considerable extent so that only a small portion of the entire volume of filtering material will be left out of effective use. The proposed normal rate of filtration will be 2,000,000 gallons per acre per day.

This type of filter, though used in a slightly different form, in England, to a considerable extent, has not been used in this country except in the case of one or two small plants. The chief objection to their use in cold climates has been the liability of freezing of the distributing devices, but the results of the thorough experimental studies of the system proposed, at the Columbus sewage testing station during the past winter, has amply justified its adoption on a large scale with the rate of filtration mentioned above. The tests showed that the average quality of the effluent from a filter operated on the sprinkling plan was superior to the effluent from the same filter operated on the contact plan.

To guard against any possible freezing of the sprinkling devices, however, the outlets of the main underdrains of each bed are controlled by gates so that if desired the sprinkling filters can be operated as contact beds during cold weather. The amount of filtering material to be provided will be fully sufficient to admit of the filters being operated on the contact plan without using more than about three contacts per day; which would not be considered an excessive rate for limited periods.

The effluent from the sprinkling filter, as it flows through the underdrains back to the gate house, will usually be purified beyond the putrescible stage although it will not be perfectly clear and it will contain a certain amount of suspended matter. In order to remove the heavier suspended particles two shallow open settling basins, each having a capacity of about 2,000,000 gallons or two and one-half hours flow, will be provided. The effluent from these settling basins is to be discharged into the westerly side of the Scioto River at a point opposite the works. The sludge or sediment accumulating in the bottom of the basins will be pumped into the river at times of high water.

It will be impossible to discharge either the settled effluent or the effluent direct from the sprinklers into the river by gravity when the water is above a 7 or 8 foot stage. At such times discharge at the pumping station will be necessary.

DISCUSSION OF RESULTS TO BE OBTAINED.

Judging from the investigations, at the testing station, into the character of the Columbus sewage it is expected that the raw sewage,

upon its arrival at the disposal works, will carry under normal conditions about 200 parts per million of suspended matter. The septic tanks will probably remove 65 per cent. of this quantity, thus giving a septic effluent carrying about 70 parts of suspended matter.

In the sprinkling filters it is expected that this suspended matter will still further be reduced so that the effluent from them will contain about 50 parts per million; and this, by treatment in the final settling basins, will be reduced in 20 or 25 parts per million. The sewage during its passage through these sprinkling filters, besides being reduced in suspended matter, will be rendered non-putrescible during practically all of the time. It is possible that upon seven or eight days each year the effluent will be slightly putrescible; but after mixing with a moderate amount of river water all signs of putrescibility will disappear. As the object in purifying Columbus sewage is to prevent a nuisance in the Scioto River rather than to protect a domestic water supply, a final effluent purified to the above extent would be quite satisfactory.

The final effluent from the settling basins will contain a turbidity of 20 to 25 parts per million and will probably never be putrescible. This amount of turbidity would not enable the effluent to be detected in the river water except at such times as the latter is unusually clear, and even then no objectionable discoloration would result.

The recent experiments show that the turbidity of this effluent, though easily reduced to 20 or 25 parts per million by two and one-half hours sedimentation, can not be reduced below this amount, even by prolonged sedimentation, because the particles constituting the turbidity are of such a light and flaky nature. To increase the capacity of the final settling basin, therefore, would be a useless expense.

The plans and description, as submitted, though general in character, show that the work proposed will undoubtedly accomplish the object for which it is designed. Carefully prepared detailed plans are now being made by the city.

Before reporting, your committee visited the site proposed for the disposal works, inspected the sewerage work, including the pumping station, now under construction, and had a conference with the city engineer, and also with the consulting engineer, in regard to certain important details not shown in the plans. It has inquired specifically into reasons for the design of certain features and has also obtained all information possible regarding the proposed method of operating the future plant. The capacity of the plant, 20,000,000 gallons per day, seems to be a reasonable figure, judging from the records of the daily discharge of the East Side intercepting sewer, made during the past year. These records show that the average daily flow in this sewer during the year was 9,100,000 gallons, the maximum being 19,600,000 gallons and the minimum 6,100,000 gallons. The maximum flow lasted only a short time and was very dilute in character. These figures represent about three-fourths of the total flow from the city.

While the disposal works will be effectually protected against flooding by high water in the river, yet, according to the plans, a rise of 7 to 8 feet in the stage of the river will prevent the purified sewage from being discharge into the stream. As before mentioned, at such times it will be necessary to discharge the unpurified sewage directly into the stream at the pumping station. The volume of flow in the Scioto River, corresponding to a 7 foot rise, would be more than ten times as much as would be necessary to satisfactorily dilute the sewage of 200,000 people.

The number of days per year in the past six years during which the river was at a 5 foot stage or higher is shown on the following table:

1899.....	28	1902.....	4
1900.....	14	1903.....	41
1901.....	9	1904.....	38

The number of days when the river reached a 7 foot stage was probably about 25 per cent. less than the number of days when it reached 5 feet.

The sewerage system of the city is so constructed that there are many overflows along the river in the heart of the city where, at times of heavy rainfall, mingled sewage and storm water are discharged directly into the stream. The occasional discharge of the sewage in this manner has been necessitated by the design of the sewerage system and can not be remedied except by enormous expenditure in separating the storm water from the sewage. The fact that such conditions exist should be borne in mind in considering the occasional discharge of sewage into the river in connection with the disposal works.

The feature of discharging the sludge from the bottom of the septic tanks directly into the river is one to which objection might be taken, at least, in case the methods proposed for controlling this discharge were not thoroughly understood.

It might be as well to mention at this place that sewage sludge, after being subjected to continued bacteriological action in the bottom of the septic tank, is quite different in character from fresh sewer sludge. The septic sludge is a black, flaky substance which although unsightly to look at, gives off comparatively little odor.

In order to study this point and also to obtain data which would be of value in designing and arranging for the operation of the Columbus sewage disposal works, the chemist of the testing station, in company with the engineer of the State Board of Health, visited the sewage purification plant at the Ohio Soldiers' and Sailors' Home at Sandusky, and made a physical, chemical and bacteriological examination into the effect of the weekly discharge of septic sludge into a small stream at that place. Inspection of the brook showed that on account of past discharges black septic sludge had been deposited at various points in the bottom of the

brook, within several hundred feet, below the sewer outlet. This sludge did not seem to be causing a nuisance and no odors could be detected except when stirred up, and then there was but little. The tank was discharged at the time of inspection and it was noted that a large portion of the septic sludge speedily settled out and that the effect of this, or previous discharges, could not readily be detected by the eye more than a thousand feet down stream; although analysis showed the effect upon the quality of the brook water at a point one-half mile down stream, one and one-half hours after the discharge took place. The ratio of stream water to sludge at Sandusky, however, was quite different than this ratio will be at Columbus, the flow of sludge being, while it lasted, two or three times the flow of the stream, and the stream was clear. Whereas, under the proposed Columbus conditions of operation the flow of the river will be many times the flow of the sludge, and at the time of discharge the river will be quite muddy.

According to the proposed method of operation the sludge will be discharged from the disposal plant in such small amounts that the pathogenicity of the river will not be increased above the usual amount. It is quite possible that with care this result could be accomplished. It is also probable that there will be several rises of 3 or 4 feet within 8 months (the period during which the tanks may accumulate sludge without emptying) though there may not be a rise of 8 or 9 feet (the highest stage at which the sludge can be drained out) for a period of six months.

The question of septic sludge discharge, therefore, is largely one of creating unsightly conditions in the river. There are two factors which tend strongly to prevent any unsightly conditions. These are first, that the black septic sludge from Columbus sewage is said to oxidize, on account of its iron contents, and to turn a brownish red before remaining in the water very long, and second, that whenever sludge would be discharged the river would be quite muddy; as even a small rise causes decided increase in turbidity.

It would be desirable, however, as an additional safeguard, for the outlet for this sludge to be so constructed that it would be submerged when in use and so that the sludge would be discharged into the current of the stream.

September 23, 1905, the Board approved the plans for proposed sewage disposal works for the city of Columbus, as shown upon drawings submitted to the State Board of Health on August 18, 1905, and as described in the accompanying application from the board of public service and in subsequent communications from the chief engineer and the consulting engineer, provided:

First—That detailed drawings of the plans already submitted be presented to the Board as soon as completed and receive its approval.

Second—That the operation and care of the works be subject to the approval of the State Board of Health at all times; and that any changes

in the method of disposing of the sludge from the septic tanks be made when requested by the Board.

October 21, 1905, detailed plans and specifications of the proposed sewage disposal works were submitted by Mr. H. O. Pond, president of the board of public service, in accordance with the first condition of the approval of the general plans, given September 23, 1905.

At a meeting of the Board held October 25, 1905, the engineer of the Board reported as follows:

These plans contain no changes, in principle, from the general plans, though an improvement in the general plans, as first submitted, has been made in one feature, in accordance with suggestions made by the State Board of Health. This improvement consists of providing for the discharge of sludge through iron pipes leading to submerged outlets in the current of the river, instead of discharging it near the bank as at first proposed.

The detailed plans minutely set forth the dimensions and shapes of the walls of the septic tank, the baffle walls, scum boards, underdrainage of sprinkling filters, distributing devices, gate house and sludge pump house, etc. All these have been carefully worked out and if built in accordance with the plans will make a sewage disposal works which can be operated with excellent results.

These plans were approved and the authorities were notified that although the first condition in the Board's letter of approval of the general plans for the proposed Columbus sewage disposal works, dated September 23, 1905, had been complied with, the second condition, relating to the operation and care of the works, was still in effect.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR DELTA.

On April 24, 1905, The Riggs and Sherman Company, consulting engineers for the village of Delta, submitted plans for a proposed sewerage system. In anticipation of these plans being submitted the engineer visited Delta on February 20, 1905, and made an inspection of the territory involved. The following report was made:

Delta is an incorporated village of about 1,300 inhabitants located upon Bad Creek, a small tributary of the Maumee River. Bad Creek has a watershed of only 40 square miles, and as most of the flow is used in the village for boiler purposes, the flow below town amounts to practically nothing in dry weather.

It is proposed to build a sewerage system to discharge into Bad Creek just below the built up portion of the village. This sewerage system will be built very gradually and it is doubtful whether more than 300

persons will make use of the sewers for many years, although the engineers estimate a larger number. There are at present a few storm sewers which may be connected with the sanitary system and be provided with overflows at the connections. In any case the average amount of sewage for a long time in the future will not be more than 30,000 to 40,000 gallons per day.

From the above information it will be seen, if the proposed outlet is allowed, that Bad Creek will become polluted, a nuisance will be created, and the value of the stream for stock watering and other purposes destroyed.

This report was presented to the Board at a meeting held April 25, 1905, and the plans were disapproved unless sewage purification works, satisfactory to the State Board of Health, be constructed before the sewers are used.

PROPOSED SEWAGE PURIFICATION.

On July 10, Mr. W. J. Sherman of The Riggs and Sherman Company, submitted plans for sewage purification for Delta.

These were referred to the engineer of the Board who made the following report:

The proposed sewerage system will be built very gradually and it is doubtful whether more than 300 persons will make use of the sewers for many years, although the engineers estimate a larger number. There are at present a few storm sewers which may be connected with the sanitary system and be provided with overflows at the connections. In any case, the average amount of sewage for a long time in the future will not be more than 30,000 to 40,000 gallons per day.

The works are to be located in the southeasterly corner of the corporation, between South Street and Bad Creek and outside of the residence district. There are no houses within 400 to 500 feet. The plans provide for a grit chamber 8 feet by 17 feet and 4 feet or 5 feet deep; holding about 4,000 gallons. The sewage will be screened before passing into this chamber and the floor of the chamber is of a concave shape and can be easily drained.

From the grit chamber the sewage will pass into two septic tanks each 8 feet by 60 feet with an average depth of 5 feet 9 inches and having a combined capacity of 42,000 gallons or about 24 hours flow with the expected amount of sewage. Both septic tanks and grit chamber can be drained onto two sludge beds each 12 feet by 20 feet and containing 18 inches of fine gravel. There is a by-pass through which the sludge from the grit chamber may be passed, in case of emergency, directly to the creek, or through which the entire flow of sewage can pass to the creek.

From the septic tank the sewage will pass into an automatic dosing tank with six different outlets, each discharging upon a sand bed. For

operating this dosing tank, approval is asked of two different systems only one of which will, of course, be used. With one system the capacity of dosing tank is about 5,000 gallons and the tank is discharged automatically through each outlet in turn, by siphonic apparatus; with the other system, the capacity of the tank is about 1,000 gallons and it is discharged automatically through each outlet in turn by means of ordinary valves operated by compressed air; the air being compressed by the sewage rising in the tank.

The sand beds, six in number, are each 30 feet by 60 feet and the total combined area is one-fourth acre. The size of each bed is comparatively small, but they were thus designed in order that the sewage may be treated in a proper manner from the time the sewers are first used. When the average daily flow amounts to 40,000 gallons per day the rate of filtration will be 160,000 gallons per acre per day.

Each bed is to consist of 12 inches of coarse gravel, 12 inches of fine gravel from $\frac{1}{8}$ to $\frac{1}{2}$ inch in diameter and 12 inches of fine sand, and each will be underdrained by three lines of 6-inch pipe leading to a main underdrain, 12 inches in diameter, which discharges into Bad Creek.

July 17, 1905, the Board approved these plans provided that the sand area be increased when deemed necessary by the State Board of Health.

The Board also advised the consulting engineers:

First—That the valve controlling the by-pass leading from the grit chamber into the creek be closed and sealed by the health officer of Delta, and that this by-pass be used only in an emergency and with the knowledge of the health officer; and,

Second—That while either system of operating the dosing tank would be satisfactory if properly adjusted and occasionally looked after, the size of tank should be such that each dose will not exceed 1,000 gallons.

REPORT ON PROPOSED SEWERAGE FOR A PORTION OF DESHLER.

In response to a request from Mr. F. J. Beck, auditor of Henry County, the engineer visited Deshler on April 22, 1905, to investigate the present and proposed sewerage conditions. The following report was made:

Deshler is located in the southeasterly corner of Henry County, upon Brush Creek, a small stream with practically no flow in dry weather. The corporation is practically level, the highest point being only 10 feet above the bottom of the creek, so that a system of sewers to drain the entire village by gravity would be an impossibility.

Messrs. Riggs and Sherman in 1902 prepared a plan of sewerage for the entire village of Deshler. The outlets were three in number and

were to be into Brush Creek at Elm Street, Main Street and Marion Street. These outlets were approved by the State Board of Health upon the condition that sewage purification works be established when deemed necessary by said Board; but these plans have never been used.

There are at present two sewers in the village; one in Main Street and extending from the center of the village to the creek. This sewer is built principally for surface drainage but may receive kitchen and laundry wastes.

Last fall the village built a sewer about a mile long, 10 inches and 15 inches in diameter, beginning in Park Street near Main Street, extending along Park Street to North Street, thence southeasterly along North Street to the C., H. & D. R. R. where it intercepts an old drain which receives the sewage from the Hotel Fayram; passing under the C., H. & D. tracks the sewer continues in a southeasterly direction as far as the corporation line, where it discharges into a county ditch. This sewer was constructed primarily to drain a stagnant pool, located near the center of the village and condemned by the village physicians as being a menace to health.

The sewer is located almost entirely in the bottom of a ditch, formerly used for drainage purposes, and besides receiving the sewage from the hotel, receives a large amount of surface and ground water from tile drains connected with it.

At the time of inspection the creek was in flood and the water was backed up in the sewer nearly three-fourths of a mile.

Plans for this North Street sewer were never submitted to this Board for approval.

The reason that approval is now asked for this sewer is that the village desires the county commissioners to continue this sewer along the bottom of the county ditch into which it now discharges, and make an outlet into Brush Creek. The length of sewer necessary to do this would be about 800 to 1,000 feet. The county commissioners refuse to make such extension unless the State Board of Health approves the sewer which is already constructed.

With the present design of this sewer, whether the county commissioners extend it or not, it would not be possible to purify the sewage without pumping and even then the sewage at all times would be so greatly diluted that purification works could not be operated economically.

The sewer is practically a ground and surface water drain, but if no more sewage is allowed to discharge into it a nuisance would probably not be created.

The extension of this sewer by the county commissioners in accordance with the wishes of the village would be an improvement over present conditions in that it would do away with an open ditch which now passes by several houses.

This report was referred to the Board at its meeting held April 26,

1905, and the outlet of this North Street sewer into the county ditch, or into Brush Creek at a point well removed from any houses, was approved, provided the village council pass an ordinance prohibiting the use of this sewer for domestic wastes other than those wastes which were then being discharged from the Fayram hotel building, and upon the condition that proper sewage purification works be built at any time a nuisance is created.

The Board also advised the authorities that under existing conditions it would be desirable to extend the outlet to Brush Creek at a point well removed from any dwelling and that plans showing the exact location of such future outlet should be submitted to the State Board of Health for approval as soon as the location was decided upon.

REPORT ON STORM SEWER IN MCGREGOR STREET, ELMWOOD PLACE.

The village engineer of Elmwood Place, Mr. H. Tozzer, on October 16, 1905, submitted plans for a storm water sewer in McGregor Street. These were referred to the engineer of the Board and the following report was made:

Elmwood Place is a village of about 2,500 inhabitants, located in Hamilton County, upon Mill Creek, and a few miles north of the city of Cincinnati. Mill Creek flows through Cincinnati below Elmwood Place and receives a large amount of sewage. At present there are three or four miles of storm sewers in Elmwood Place, but no domestic sewers.

The proposed sewer is to be 700 feet long and 18 inches to 24 inches in diameter. It is located principally in McGregor Street and discharges into Mill Creek. The sewer is to relieve the present storm water system as well as to receive storm water from an additional area of a few acres. It is understood that no domestic sewage is to be discharged into it.

The report and plans were considered by the State Board of Health at a meeting held October 25, 1905, and the plans, as shown on drawings submitted October 16, 1905, were approved provided that no domestic sewage be allowed to discharge into this sewer.

REPORT ON PROPOSED CHANGES IN SEWERAGE PLANS FOR ELYRIA.

The city auditor of Elyria, Mr. Frank R. Fauver, on July 10, 1905, submitted a map showing proposed changes in a sewerage system for that city, already approved by the State Board of Health. Mr. Fauver had

previously submitted a copy of a resolution recently passed by the city council, adopting these proposed changes. In anticipation of this question being submitted, Elyria was visited on June 23, 1905, by the engineer of the Board, and the following report was made :

The present population of Elyria is estimated at 10,000. There are at present ten or more miles of combined sewers which receive domestic sewage from some 2,000 people. These sewers discharge at some thirty different outlets into the east and west branches and also the main stream of the Black River. At some of the outlets a nuisance is caused during dry weather and the Black River immediately below the city is considerably polluted.

In September, 1904, complete plans for a sewerage system for Elyria, to intercept the dry weather flow from the present sewers as well as to afford sewerage for new sections of the city, were presented to the State Board of Health. The Board approved the plans but recommended that the present combined sewers be excluded from the system as soon as practicable and used for storm water only; and disapproved the outlets of this system into Black River unless the sewage be purified in a manner satisfactory to the State Board of Health before being discharged into the river.

On March 26, 1905, a letter was received from the president of the board of public service, Mr. H. M. Andress, asking for an extension of time in which to build sewage purification works, or, in other words, asking for a temporary outlet into Black River for the new system. The following reasons were given for making such request: First, the city already had a bonded indebtedness of over 11 per cent., which is above the limit; and second, there was a strong sentiment against building a disposal plant until such time as the majority of the cities of Ohio disposed of their sewage in like manner.

In reply to the above the engineer reported that there were thirty-two sewage disposal plants in operation in Ohio, and that plans for thirty more had been made and approved by the State Board of Health; that of the sewered cities of Ohio which have as small streams into which to discharge sewage, in proportion to the population, there were only nine which had not, or were not soon to have, purification works, and four of the nine were taking preliminary steps toward sewage purification.

He further stated that there were several farmers living along the river between Elyria and the lake, and the river was used for stock watering, for bathing, and, according to the statement of one farmer, for domestic purposes when the private wells were dry.

In 1904 the Board approved plans for the disposal of sewage from the property of The Sheffield Land Company into the Black River just above Lorain and some eight miles below Elyria. This was with the understanding, however, that purification works should be installed at any time after a year that the Board might designate. The company is a private corporation and the officials agreed to the above condition.

At a meeting of the State Board of Health held in April, 1905, this matter was considered and the board voted to require that plans for sewage purification works be made at once and submitted to the Board for approval, and in case these plans were satisfactory to grant an extension of two years time in which to build purification works, after the new sewers were first put in use, provided sufficient guarantee be given that the works would be built at the end of that period. A letter of approval to this effect was mailed May 1, 1905.

The modifications of the general plans approved in September, 1904, consisted in slight changes of grade and location of some of the main sewers, but principally in the relocation of the two main outlets of the system. Under the plans already approved, the two main outlets were to have discharged into the Black River 1,500 feet below the junction of the east and west branches of the river. It was later proposed to discharge the sewage at a point 1,200 feet further down stream, or 2,700 feet below the junction of the east and west branches; the two main sewers to enter the river near the same point but on opposite sides of the stream. With outlets so located it was said that future sewage purification would be made easier.

July 17, 1905, the Board approved the plans submitted July 10, 1905, showing modifications in the sewerage plans approved September 22, 1904, subject to the same conditions as those under which the former proposed outlets were approved, as set forth in the letters of approval sent to the consulting engineers September 22, 1904, and to the board of public service May 1, 1905.

REPORT ON PROPOSED SEWER IN CENTER AND SOUTH STREETS, HURON.

November 28, 1905, Mr. S. M. Glenn, Jr., superintendent of schools of Huron, acting for the board of education of that village, submitted plans for proposed sewerage in Center and South Streets. The engineer of the Board visited Huron on December 6, 1905, and the following report was made:

Huron is a village of about 2,000 inhabitants, located in Erie County, on the shore of Lake Erie and at the mouth of Huron River.

There is at present no public water supply for the village and there is said to be but one sewer, which is in Main Street and discharges at the foot of South Street near the proposed outlet. This sewer was built primarily for surface drainage, but it is said that it is now used by several houses and stores for domestic drainage. The outlet of the sewer is submerged beneath the ordinary level of the river and apparently creates no nuisance. The river level at this point is fixed by the level of the lake.

Recently the United States government has begun to improve Huron harbor and the Wheeling and Lake Erie Railroad proposes to make this village an important shipping point for ore and coal. It is expected, therefore, that the village will grow rapidly in the next few years and this growth has already begun.

The proposed sewer is to begin in Center Street at the corner of Van Rensselaer Street and extend northerly in Center Street to South Street, and thence in South Street, easterly, to the river. The Center Street portion is to be 1,800 feet long and 12 inches to 18 inches in diameter. This portion is to be constructed and paid for by the village council. The portion in South Street is about 800 feet long, 18 inches to 24 inches in diameter, and is to be built and paid for by the board of education. This unusual arrangement for building a sewer was arrived at as a sort of compromise between the council and the board of education, as the latter desired an outlet for the drainage from a large schoolhouse on Center Street. In addition to paying for the construction of the lower part of the sewer as described above, the board of education is to pay the usual entrance fee for tapping the Center Street portion of the sewer.

The proposed sewer is designed on the combined plan and is intended to drain the surface water from the streets through which it passes as well as from certain intersecting streets. This will necessitate 21 catch basins along its route, and in addition surface water will be drained into 8 manholes. Experience in the use of a sewer of this design has shown that frequently odors are created by reason of the deposits resulting from the material washed in by storm water together with the domestic sewage. A combined sewer, of this design, will be much harder to keep clean than a smaller domestic sewer. As there are no waterworks at present the only flushing which can be obtained will be by means of a tank in the schoolhouse and that effected by the drainage from bath tubs and water closets at private residences which may connect with the sewer. The opportunity for the escape of odors, in such a way as to create offense, from the smaller domestic sewer would be much less than the opportunity for odors to arise from the combined sewer as proposed.

The discharge of sewage into Huron River at the point proposed, if made through a properly constructed outlet, would probably create no offensive conditions, at least for a long time in the future. The Huron River at this point is 20 feet deep and 300 feet wide, and forms the upper end of the harbor. The extensive use of the harbor for commercial purposes, both at present and in the future, will make it impossible to keep the water therein free from pollution. The sewage and refuse from the large boats which will be anchored in the harbor at all times will be large in comparison to the amount of sewage which will probably be discharged by the village. Furthermore, as the long piers forming the harbor extend fully 3,000 feet into the lake beyond the proposed outlet

the sewage flowing out with the river current will enter the lake at a considerable distance from the shore. This will make it possible to locate future waterworks along the beach within a reasonable distance from the village without danger of receiving the direct influence from the discharge of sewage at the point proposed. A filtration plant would be necessary in any case with future waterworks.

December 22, 1905, the Board approved the location for the outlet of the proposed sewer in Center and South Streets, to discharge into the Huron River at the foot of South Street (as shown on plan submitted November 28, 1905), provided the outlet be so constructed that the sewage will be discharged below the surface into deep water; and disapproved the plan to make this a combined sewer; believing that under the conditions at Huron it would be much better to provide a separate sewer for storm water and another sewer for household wastes.

REPORT ON PROPOSED SEWERAGE FOR THE JEFFERSON COUNTY INFIRMARY, NEAR STEUBENVILLE.

The health officer of Steubenville, on June 13, 1905, notified the State Board of Health that the directors of the Jefferson County Infirmary were about to commence the construction of a new infirmary building and that the sewage from this building would probably be discharged into a small run. Later Mr. Fred C. Elliott, of Columbus, architect for the new building, called at the office of the Board and made application for approval of a proposed new sewer outlet. The engineer of the Board visited the site of the new building on July 5, 1905. The following report was made:

The county infirmary farm is located about three miles west of Steubenville, on the Wintersville road.

The present buildings are very old and unsanitary. The woman's department is provided with water closets and sewers which discharge into the upper end of Pernar's Run, which stream has its source in the overflow from a spring about 1,000 feet east of the buildings and which is used at present as a source of water supply for the institution. Owing to the clogged condition of the closets and sewers, however, very little sewage now reaches the run. The men's department is provided with dry vaults.

From the spring, Pernar's Run flows in a southeasterly direction for a distance of about four miles and then discharges into the Ohio River near the southerly limits of the city of Steubenville. During its course, the flow is increased by numerous tributaries. Immediately below the institution the run passes through the center of a narrow strip of pasture land about three-quarters of a mile long owned by the institution.

This affords the only pasturage for the cattle. Below the institution pasture is another pasture in which cows belonging to private individuals are kept. From a point on the stream about two miles below the infirmary to the mouth of the stream there is a population of probably 1,000 living close to the stream; the lower portion of the stream being the most thickly settled. The stream passes within 20 to 30 feet of many houses and while the water is probably not used for drinking, it is used for washing purposes, watering domestic animals and as a place for children to play in. Along the middle portion of the stream, that is about half way between the infirmary and the Ohio River, the houses are of a decidedly respectable class and are well kept up. The run, along here, appeared to be in a quite satisfactory condition. Along the lower portion of the stream, however, the houses are of a poorer character and the stream is used to some extent for a dumping place for rubbish; although this is against the city ordinance.

It is proposed to discharge all the sewage from the new infirmary building, at which there will be about 125 inmates, into the upper portion of Permar's Run a short distance above the present outlet. The quantity of sewage to be discharged through the new outlet would be, of course, much greater than that being discharged at present, or that ever discharged in the past.

A new and abundant water supply has already been provided for. This supply is to be derived from a number of springs located on a hillside some distance from the infirmary.

In view of the facts. First, that the flow of Permar's Run, especially at its upper end, is so small that it would be seriously polluted by the discharge of sewage as proposed; Second, that this stream must be used to a large extent for watering cattle; Third, that the presence of such a polluted stream in a pasture would afford a danger to the consumers of the milk from the cattle pastured therein; and Fourth, that the lower portion of this run, between two and four miles below the infirmary, passes within a very short distance of a large number of houses, the occupants of which should be protected, the discharge of sewage from the infirmary into Permar's Run should not be permitted unless the sewage be first purified.

The proposed plan of discharging sewage from the Jefferson County Infirmary into Permar's Run was disapproved by the Board on July 12, 1905, unless a sewage purification plant, satisfactory to the State Board of Health, be first constructed and the sewage purified by it before being discharged into the run.

REPORT ON PROPOSED SEWERAGE AND SEWAGE DISPOSAL FOR LEETONIA.

The consulting engineers for the village of Leetonia, Messrs. Williams and Whitman of New York, submitted plans for proposed sewerage and sewage disposal on May 17, 1905. In anticipation of these plans being submitted, Leetonia was visited by the engineer of the Board on January 17, 1905. The following report was made:

Leetonia is a village of about 3,000 inhabitants, located in the northerly part of Columbiana County on Beaver Creek, which, at this point, has a watershed of about 20 square miles and is nearly dry at times.

The village of Lisbon, about 10 miles below, has in the past used the water of Beaver Creek for public water supply purposes and may in the future, if the present supply from wells runs short, use the creek water again.

According to the plans presented, the sewage from the entire village will be conveyed to a collecting reservoir located in State Street, near the southerly part of the corporation. From the collecting reservoir the sewage will be pumped through an 8-inch force main to purification works, located some thousand feet south of State Street and immediately south of the junction of the southerly branch of Beaver Creek with the main stream.

It is proposed to build 10 miles of sewers immediately and it is expected that these will be used by 2,500 people. The quantity of sewage expected upon completion of the ten miles of sewers is estimated at 150,000 gallons per day. These figures are obtained by estimating the daily yield of each person using the sewers at 60 gallons.

The purification works proposed are designed to have a nominal capacity of 225,000 gallons daily. They consist of a septic tank 20 feet by 62.5 feet, with a total depth of 8 feet; thus giving a total capacity of 75,000 gallons. At the outlet is placed a movable wier by means of which the depth of sewage in the tank may be changed from 8 feet to 5 feet, as desired. With a daily flow of 150,000 gallons the tank may be made to hold from 7.5 to 12 hours flow; while with a daily flow of 225,000 gallons the septic period may be varied from 5 hours to 8 hours.

The septic tank effluent passes into an automatic distributing device or "contact controller" and is then treated on contact beds.

These contact beds are five in number, each approximately in the form of an equilateral triangle, the whole group of beds having the form of a pentagon with the controlling device located in the center. The length of the one side of the pentagon is 18 feet. Each contact bed has a capacity of 25,000 gallons; which means that they will be operated, when the total flow is 150,000 gallons, at the rate of 1 1-6 contacts per day; while with the ultimate capacity of 225,000 gallons there will be nearly two contacts per day.

According to the plans, the effluent from the contact beds is to discharge upon five sand filters, having a total area of one-half acre, which gives a maximum rate of filtration of 450,000 gallons per acre per day. It is not proposed, however, to build the sand filters at once, but to wait until they are found necessary.

The Board on May 24, 1905, approved these plans, submitted May 17, 1905, provided:

First—That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used.

Second—That the septic tank and contact beds be constructed before any of the sewers are put in use, and

Third—That the sand filter beds be installed when deemed necessary by the State Board of Health.

REPORT ON PROPOSED FILTERING MATERIAL FOR USE IN THE SEWAGE DISPOSAL PLANT AT MARION.

In the letter of approval of the plans for the Marion sewage purification plant, sent October 1, 1904, the attention of the authorities was called to the agreement already made that samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used.

Samples of the different grades of filtering material were submitted for approval and examined by the engineer of the Board, and the following report was made:

The contact bed material, consisting of hard limestone crushed into pieces of from 1-2 inch to 1 1-2 inch, average diameter, was inspected in bulk at the quarry by the engineer of the Board. The upper 3 feet of the contact beds will consist of this material and there will be a 1-foot layer of coarser crushed stone beneath. The use of this material would be quite satisfactory and the best results would probably be obtained with it. This contact bed material is now being or has already been put in place.

The proposed filtering material for the stone or final filter beds is to consist of the usual bottom 6-inch to 9-inch layer of coarse gravel or broken stone, over which is to be placed about 2 feet of fine screenings from the stone crusher, and over this is to be a 6-inch to 9-inch layer of an excellent grade of lake sand. Samples of the screenings and also of the lake sand have recently been submitted for approval, and mechanical analyses have been made of these grades of material by your engineer.

The screenings, which are composed of very fine crushed limestone, have an effective size of about .85 mm. and a uniformity coefficient of 6.0. This is comparable to a quite fine gravel. There were several larger

pieces of crushed stone in the sample submitted which gave the material the appearance of being coarser than it proved to be upon analysis. Crushed sandstone, obtained from the rock in a similar manner, but of finer and more even size, is now being used with entire satisfaction in two intermittent sand filtration plants in this State.

Experimental studies have shown that nearly all the purification effected in an intermittent sand filter takes place within approximately 4 inches of the top of the filtering material. The top layer is therefore the most important.

The sample of lake sand to be used for the upper 6-inch to 9-inch layer of filtering material was found upon analysis to have an effective size of .35 mm. and a uniformity coefficient of 3.5. This sand was clean and free from dirt. Its size and character were quite satisfactory considering the high rate at which the final or sand filter will be used.

October 19, 1905, the Board approved:

1st. Hard broken limestone, consisting of pieces of approximately 1-2 to 1 1-2 inches in diameter, as filtering material for use in the contact beds.

2d. Fine limestone screenings, represented by a sample submitted to the State Board of Health on October 7, 1905, and having an effective size of about .85 mm. and a uniformity coefficient of about 6.0, as filtering material for use in the lower or main portion of the final or sand filters; and, •

3d. Lake sand of a grade known as "Mason sand" and as represented by samples submitted on October 10, 1905, having an effective size of about .35 mm. and a uniformity coefficient of about 3.5 as filtering material for use in the upper portion of the final or sand filters.

REPORT ON PROPOSED SEWERAGE AND SEWER OUTLET FOR MONROEVILLE.

On February 21, 1905, The R. J. Wood Engineering Company of Cleveland, consulting engineers for the village of Monroeville, submitted plans for a proposed sewerage system, with the outlet into the Huron River. Monroeville was visited by the engineer of the Board, March 21, 1905, and the location for the proposed outlet inspected. The consulting engineers were notified that more information would be necessary before action could be taken by the State Board of Health. The desired information was furnished on October 17, 1905, and the following report was made:

Monroeville is a village of about 1,300 inhabitants, located in Huron County, upon the Huron River, which at this point has a watershed of about 80 square miles and the average dry weather flow is, probably,

about 4 to 5 cubic feet per second. There are but two communities located near the river below Monroeville. These are the village of Huron, 16 miles distant, located at the mouth of the river, and the village of Milan, 8 miles distant, following the river. Neither of these villages uses the river for a public water supply.

The village of Monroeville covers an area of about one square mile and is bounded on two sides by the Huron River and one of its branches. There are no public sewers in the village, but several houses have private drains which discharge sewage directly into the river. The public water supply of Monroeville is taken from the river near the center of the town and there is a dam about 2,000 feet below the waterworks intake which backs up the water to a point considerably above this intake. The practice of discharging sewage through these private drains into the river above the dam is therefore decidedly dangerous.

The proposed plans provide for collecting the domestic sewage from the entire village, by means of pipe sewers varying from 8 inches to 15 inches in diameter, and for discharging it through a 15-inch outfall sewer into the Huron River at a point in the lower or northerly portion of the village, just below the built-up portion and opposite the foot of Broad Street. The point of discharge is well below the dam. Within 600 feet of the proposed location of the outlet are eight houses and one factory. The nearest house is about 300 feet distant and the factory 150 feet distant. Several hundred feet below the proposed outlet is an area of land bordering the river which could probably be used with satisfaction as a site for a future sewage disposal plant.

It is expected that about 800 persons will use the sewers as soon as the entire system is built. At 40 gallons per capita daily, the flow of sewage would be 32,000 gallons per day. It is not expected, however, that more than a small portion of the proposed sewers will be built within the next few years. The entire system is designed to serve a population of about 5,000.

There are no manufacturing wastes which will be discharged into the sewers although there are some ten factories in the village which will connect their water-closets with the sewers. Flush tanks are to be provided at the upper ends of the lateral sewers. Cellar drainage is not to be admitted.

The dry weather flow of the Huron River, being 4 or 5 cubic feet per second, is probably sufficient to satisfactorily dilute the sewage of 1,000 persons, or three-fourths of the present population of the village. Judging from the general tendency of other Ohio streams, however, its dry weather flow will probably become less in the future. Moreover, the flow of the river may at times be held back by the dam above the outlet.

Only a small portion of the proposed sewerage system will be built for several years and the present dry weather flow of the river is sufficient to take care of the sewage for about three-fourths of the present population of the village.

This report was presented to the Board at a meeting held October 25, 1905, and the plans, as shown upon drawings submitted February 21, 1905, were approved, provided:

1st. That the main sewer outlet be extended, by means of iron pipe, well out into the current and discharged below the level of the lowest stage of the river.

2d. That the village of Monroeville obtain control of land adjacent to the river below the proposed site for the outlet for use for sewage disposal purposes.

3d. That plans for a sewage disposal plant be prepared and submitted to and approved by the State Board of Health before any of the proposed sewers are built; and,

4th. That such sewage purification plant, after having been approved by the State Board of Health, be constructed whenever the number of persons using the proposed sewers amounts to two hundred or more; or at such time as may be found necessary by said Board.

REPORT OF AN INVESTIGATION OF A SEWER IN ELYRIA STREET, NORTH AMHERST.

November 8, 1905, Dr. W. Foster, the health officer of North Amherst, asked the assistance of the State Board of Health in remedying certain bad sanitary conditions which existed in the village. On December 5, 1905, the engineer of the Board visited that place and the following report was made:

North Amherst is a village of about 2,000 population, located in Lorain County, upon Beaver Creek, a small and practically intermittent stream, at a point about three miles south of where this creek enters Lake Erie.

About three years ago certain merchants in North Amherst constructed an 18-inch tile sewer, about 1,000 feet long, in Elyria Street, the principal business street of the village. The upper end of this sewer is near the corner of Church and Elyria streets. It discharges into Beaver Creek near the Elyria Street bridge. Though built primarily to drain cellars and surface water, this sewer is used to a considerable extent for domestic wastes. It is not known which buildings use this sewer for this purpose, but that such use is made of it is plainly evident by the fecal matter and other waste substances deposited near the outlet of the sewer. An old sewer in Cleveland Street, used, it is said, for drainage and sewage, connects with the Elyria Street sewer at the junction of the two streets.

At the point of discharge into Beaver Creek there is a pool in the stream in which the water is said to be stagnant in dry weather. Water

from this pool is used for street sprinkling purposes and the odors resulting from this practice are said to be very offensive. At the time of inspection the end of the sewer, 5 or 6 feet above the water in the creek, was broken so that the sewage was leaking out through an open joint and spreading over a pile of rocks on its way to the stream.

In addition to the pollution of Beaver Creek on account of the sewage discharged therein from the Elyria Street sewer, the odors arising from the sewer itself through the catch basins or storm water inlets in Elyria Street are said to be very offensive at times. Odors are forced backward through the cellar drains into the houses and buildings connected with the sewer. The grade of the sewer is said to be such that proper flushing is difficult and the absence of a public water supply makes the condition still worse.

Plans for this sewer were never submitted to the State Board of Health for approval. If they had been submitted the Board would undoubtedly have disapproved the discharge of sewage into Beaver Creek; as the stream is entirely unsuited for this purpose. The settlement owned by the Ohio Quarries Company, located on the same stream about three miles south of North Amherst, has recently installed a sewage purification plant, plans for which were approved by the Board.

December 20, 1905, the Board disapproved the sewer outlet, for the 18-inch tile sewer in Elyria Street, discharging into Beaver Creek, and the board of trustees of public affairs was notified that the discharge of unpurified sewage into Beaver Creek should cease by September 1, 1906. It was also advised that, for the health of the community, a proper sewerage system with purification works should be installed at the earliest possible time and that plans for such works should receive the approval of the State Board of Health.

REPORT ON PROPOSED SEWERAGE FOR NORWALK.

The city of Norwalk, through its city solicitor, Mr. Edgar G. Martin, made application for the Board's approval of sewers for two sections of the city. The engineer visited Norwalk on March 22, 1905, inspected the territory in question, in company with several city officials, and received plans of the proposed work. The following report was made:

Norwalk is located in Huron County upon the watershed of the Huron River. The northerly portion of the city drains naturally into two small intermittent streams or ditches, which unite at a point about one mile north of the corporation and then, after flowing two miles farther in a northerly direction, discharge into the Huron River just above the village of Milan.

The southerly portion of the city drains naturally either into Norwalk Creek, which enters the east fork of the Huron River about a mile southwest of the corporation, or into ditches leading directly to the East Fork. Norwalk Creek has a watershed of only about 10 square miles. It is impounded, above the city, for use as a public water supply. The flow, therefore, through and below the city is at times reduced to practically nothing. The dry weather flow of the East Fork, as well as the main stream of the Huron River, judging from accurate measurement of the discharge of the Black River which has a similar watershed, is not sufficient to satisfactorily dilute the sewage of the city of Norwalk.

There are at present thirteen or more miles of sewers in Norwalk. All of these sewers are built on the combined plan; being used for domestic sewage, storm water and also, in some cases, for land drainage. The sewers have been constructed in an unsystematic way and discharge into the nearest ditch or water course. Little, if any, attention has been given to the sanitary features or to the ultimate disposal of the sewage. Reports of previous investigations, made by a representative of the State Board of Health, state that the discharge of sewage under present conditions causes a nuisance in dry weather. Most of the present sewers were built before the law made necessary the approval of the State Board of Health. Plans for one sewer, however, in the westerly part of the city, to drain an area bounded by Main Street, Pleasant Street, the Wheeling and Lake Erie Railroad and the west corporation line, were presented to and acted upon by the Board in October, 1902. The Board at that time voted to approve of the sewer, "but only as a temporary expedient." In the letter of approval to Mr. John Laylin, the city engineer, it was further stated that the Board was of the opinion that this sewer would simply transfer the nuisance from one place to another; that a much smaller number of persons would be annoyed by the nuisance so transferred, but that Norwalk had reached the proportions where it should expect to care for its sewage in a proper manner, and the Board strongly urged that the question be taken up at once of providing a comprehensive system of sewerage with sewage purification works.*

No steps toward providing a "comprehensive system of sewerage" at least in the way that was intended by the Board, have been taken since the above letter was sent, although it is said that some time in the past a complete sewerage plan for the city was made; but this plan was disregarded and is now lost.

PROPOSED WORK.

Sewerage for Milan Street District. It is proposed to provide additional sewerage for a district in the northerly part of the city, having an area of 275 acres, and bounded by Main Street on the south, the Wheeling and Lake Erie Railroad on the east, and Wooster Street on the west;

and extending as far north as the intersection of Cline and Milan streets. The southerly portion already contains about a mile of sewers which discharge through two outlets into open ditches by the side of the street, well within the built up portion of the city. These ditches lead in a northerly direction to the Huron River, as above described. The total length of sewers proposed for this district is about one mile. They will be on the combined plan and will vary in size from 10 inches to 36 inches. The main sewer is to discharge into the same ditch which receives the sewage from the present sewers, but at a point nearly one-half mile below the present outlets. This main sewer will, to a certain extent, replace the present ditch. The principal reason, apparently, for building these sewers is the desired development of a certain area which cannot be used until thoroughly drained, and also the necessity of reducing the ground water level in an area now being built upon. It is largely, therefore, a land drainage proposition, although the intention is to admit domestic wastes of all kinds to the sewers.

As far as draining the district of storm water and superfluous ground water is concerned, the proposed sewerage scheme would be satisfactory, but the plan of including domestic wastes will cause serious trouble with, and probably prevent the operation of, any scheme of sewage purification.

Elm Street Trunk Sewer. It is proposed to construct a relief sewer to assist in draining a district in the southeasterly portion of the city in the vicinity of Benedict Avenue and Norwood Avenue.

This district is about 200 acres in area and contains at present 2.7 miles of sewers, all on the combined plan and discharging through one outlet in Norwalk Creek at the foot of Benedict Avenue. On account of the small size of the outlet sewer and on account of the street grade of the lower portion of the sewer, in times of heavy rain, the sewage backs up into several houses near the outlet, causing much damage. In order to obviate this, it is proposed to intercept the drainage from the present sewers at a point some distance above the outlet and thus divert the drainage from the upper portion of the district into Norwalk Creek at a point about one-third of a mile down stream from the present outlet.

The construction of this sewer would improve present conditions by preventing the flooding of houses and by conveying further from town a portion of the sewage, which is now being discharged in the center of the city, into an inadequate stream. On the other hand the proposed location of the outlet is at no great distance from several buildings and sewage discharged here in considerable quantities, as would eventually be the case, would cause a nuisance. Also, as in the case of the Milan Street district, the construction of the sewer would not be in accordance with plans for future purification of the sewage.

These plans for proposed sewers for the Milan Street district and the plans for the proposed trunk or relief sewer in Elm Street were approved by the State Board of Health, on March 28, 1905, provided that

these proposed sewers be used for the drainage of surface water or ground water only, and that the city council pass an ordinance forbidding the tapping of these sewers, or any sewers tributary thereto, for the purpose of admitting household wastes of any kind. The authorities were advised that such ordinance need not apply to house connections already made with present sewers, which sewers as shown on the plans were to connect with the proposed sewers; but such ordinance should forbid the further use of said present sewers for household sewage.

The Board also wrote the city solicitor as follows:

"In endeavoring to make one sewer serve both for the conveyance of household wastes and the drainage of surface water and ground water, you are seeking to combine two principles which are decidedly opposed to each other.

"One of these principles is that where sewage purification must be planned for, as is the case at Norwalk, the only satisfactory and economical way of collecting the sewage is by means of small sewers from which all surface water is excluded and which have tightly cemented joints. The quantity of sewage to be purified is thus kept at a minimum and the cost of constructing and operating the purification plant correspondingly reduced.

"The other principle is that where surface water is to be drained away, the sewers must be comparatively large and if in addition it is desired to reduce the level of the ground water, the sewers must have open joints.

"On account of the foul character of domestic wastes, the sewers which receive them must be of greater length, in order to convey the sewage to an unobjectionable locality, than sewers which receive only surface or ground water and which may discharge without offense, into the nearest water course or open ditch. Furthermore, small sewers can be much more easily kept clean than large ones and for this reason afford little or no danger of creating offensive odors to the occupants of the houses connected or to persons passing along the street, whereas large combined sewers usually become, during dry periods, elongated cesspools reeking with filth.

"It is clear, therefore, that where surface and ground water, as well as domestic sewage, must be drained away from a city, that the most efficient and, at least in the end, the most economical plan is to adopt the double or separate system of sewers, and this is especially true where sewage purification is necessary.

"The topography of the city of Norwalk is not well adapted for the collecting of the sewage from the entire city at one point; but it would be apparently no more difficult to obtain a satisfactory solution of the problem in your city than in many other cities having similar topographies and which have constructed proper and efficient systems.

"This Board, in October, 1902, at the time it approved plans for your

west side sewer, but only 'as a temporary expedient,' urged you in the letter of approval, to have a comprehensive plan made for sewerage, including sewage purification, for the entire city. Such a plan has not been made, but on the contrary the city still desires to continue its former undesirable method of building combined sewers and of polluting the nearby water courses.

"The Board again urges you to take immediate steps to have plans made which will determine the best and most practicable method of collecting and disposing of the household wastes of your city as regards both present and future needs."

June 28, 1905, application was made by Mr. Edgar G. Martin, for approval of sewerage projects in the Milan Street and Elm Street districts, these plans being a revised plan of those approved conditionally March 28, 1905. In addition, applications and descriptions, signed by the street committee of the council and the city engineer, together with a blue print showing the proposed sewers, were submitted. The engineer of the Board, having visited Norwalk, June 24, 1905, reported that council had failed to pass the ordinance required in the Board's approval of March 28, 1905, for the reason that the property holders in the districts which it was proposed to serve protested against the assessment unless the sewers could be used for domestic as well as all other purposes. The sewers approved conditionally on March 28, 1905, had therefore not been constructed. He further reported as follows:

Milan Street Project. It is now proposed to construct only a portion of the Milan Street district sewers as first proposed; that is, the present old sewer in Milan Street, between St. Marys Street and the open ditch into which it discharges, is to be taken up and relaid at a lower grade with its outlet practically at the same point. In addition, sewers connecting with the Milan Street sewer are to be laid in Chatham, St. Marys, North Gordon and Harkness streets. These are designated in the application as storm water sewers, but the sizes are not shown.

Permission is asked to use these sewers for "sanitary purposes" pending the preparing and the approval by the State Board of Health of a comprehensive sewer plan for the entire city, and the construction of sanitary sewers on said streets proposed to be sewerred.

The construction of sewers in these streets is said to be very urgent on account of a large amount of proposed building; the large amount of water in the ground making it impossible to build unless the ground is first drained and as all new houses must sooner or later be provided with sewerage for domestic purposes it is desired to use these storm water sewers for this purpose until proper sanitary sewers can be provided.

If the State Board of Health could have proper assurance that the city would provide sanitary sewerage for this district as soon as it is possible to do so, in accordance with a plan including the entire city, it would seem that they should be allowed to do this as such use of these storm water

sewers would simply mean a slight increase of pollution to an already polluted ditch.

Elm Street District. It is now proposed, in Elm Street district, to construct instead of a new sewer as formerly proposed, simply an overflow sewer which will remove the excess storm water from the present sewers when the latter are three-fourths full. The overflow sewer will have its outlet at the foot of Elm Street, into Norwalk Creek, which already receives the sewage from this entire district, at a point nearer town.

This overflow sewer does not mean a new outlet for dry weather sewage and its installation will prevent the flooding of a large number of cellars with sewage from the overcrowded sewers of this district, at time of severe storms.

The Board approved the storm sewers proposed in Milan Street, St. Marys Street, North Gordon Street and Harkness Street, July 5, 1905, as shown on the blue print and described in the application of the street committee of the city council and the city engineer, under date of June 24, 1905, and in addition approved the use of the above sewers for house drainage for a period of one year from date of completion, upon the condition that the council pass an ordinance providing for a general plan of sewerage and sewage disposal, satisfactory to the State Board of Health, for the entire city; and for the construction of sanitary sewers in the above named streets as soon as such general plan is completed and approved by the State Board of Health, and that a certified copy of such ordinance be filed with the Board as soon as passed.

The proposed overflow sewer in East and West Elm streets, from Linwood Avenue westerly to Norwalk Creek at Pleasant Street, was also approved July 5, 1905, said sewer to be so constructed that it would receive no sewage except at such times as the present sewers in Maple Street, Norwood Avenue, Benedict Avenue and South Linwood Avenue were running at a depth of three-fourths of the diameter of the pipe.

REPORT UPON PROPOSED SEWERAGE FOR NORWOOD.

Application for the Board's approval of a proposed sewerage scheme for Norwood was made by Mr. J. A. Stewart, the city engineer, and Mr. Oliver W. Bailey, city solicitor. The president of the Board appointed Dr. Stanton, a member, and the engineer, a committee to make the necessary investigation. This committee inspected the proposed plans and conferred with the city engineer of Norwood, at Cincinnati, on May 26, 1905. The following report was made:

Norwood is a city of some 7,000 population, situated immediately northeast of the present city limits of Cincinnati. Approximately one-half of the city drains into Duck Creek, a small tributary of the Little Miami

River, while the drainage from the remaining half of the city naturally passes into Bloody Run and thence to Mill Creek, the notoriously polluted stream which passes through the heart of Cincinnati. Bloody Run also receives much other sewage in addition to that from Norwood.

A large intercepting sewer in the valley of Mill Creek has been planned, the necessary authority for building it has been secured and it is probable that actual construction will be commenced in the near future. It is also necessary, by reason of judgment against those polluting Bloody Run, that a sewer be built to enclose this stream.

The farmers living along Duck Creek below the city of Norwood have brought suit and procured judgment against Norwood and also Cincinnati, for polluting the stream. The sewage will, therefore, now have to be excluded from Duck Creek.

At present there are in Norwood some 22 miles or more of sanitary sewers and five or six miles of storm sewers, discharging into both Bloody Run and Duck Creek. According to the plans, as submitted, it is proposed to drain as much as possible of the Norwood sewage by means of existing sewers and proposed sewers, into the new Bloody Run sewer to be built by the city of Cincinnati. The total length of sewers to be built by the city of Norwood for this purpose, as well as to afford sewerage to recently built-up portions, is about 9,000 feet.

The sewage which cannot, under the above plan, reach Bloody Run by gravity will be conveyed to a tank or receiving basin to be located near the corner of Harris Avenue and Duck Creek road. This basin is to hold about 100,000 gallons and will be divided into two sections, so that one section can be pumped out while the other is filling.

In addition, sewage from Evanston, Hyde Park and a part of Walnut Hills (all parts of Cincinnati) will be conveyed through the Norwood sewers to the same point.

From the receiving basin the sewage will be pumped intermittently, by means of compressed air, into the Bloody Run system. The air compressor will be located at the present waterworks pumping station, some thousand feet away, and will be operated by the waterworks engineer, who will be notified by means of an automatic device when the tank is full.

The proposed scheme will afford a satisfactory method of disposal of the sewage of Norwood, at least as soon as the Bloody Run and Mill Creek sewers are built.

These plans, as submitted May 26, 1905, for discharging, by gravity and by pumping, the sewage of the city of Norwood into the proposed Bloody Run sewer of the Cincinnati system (which will connect with the proposed Mill Creek interceptor) were approved by the Board, June 6th, 1905.

REPORT ON PROPOSED STORM WATER SEWER AT PAULDING.

October 24, 1905, it came to the attention of the State Board of Health that the village of Paulding was about to construct new sewers. After correspondence with the mayor, Mr. William Moorhead, the engineer visited Paulding, October 27 and 28, and the following report was made:

PRESENT CONDITIONS.

The proposed new sewerage construction consists principally in building a 12-inch sewer, 900 feet long in North William Street. This sewer is to connect with a 4-foot brick sewer in Jackson Street, which has been built for many years and affords the main outlet for the village.

It is also proposed to build (and construction has already commenced) a 12-inch sewer 1,800 feet long, which is also to connect with the present Jackson Street sewer. Both these new sewers will have cemented joints and will be used for both storm water and domestic sewage.

The main sewer in Jackson Street, above mentioned, is probably three-fourths of a mile long, beginning in the westerly part of town and discharging into Flat Rock Creek, near the easterly corporation line, a few hundred feet north of Jackson Street at a point just south of the cemetery and 200 feet from the DeWitt Pike.

It is stated that this sewer receives sewage from practically half the population of the village, as there is a public water supply and most of the houses are provided with modern plumbing. The outlet is protected by a substantial stone bulkhead, high above the bed of the stream. As Flat Rock Creek is practically dry for a large portion of the time there is no water to dilute the sewage; consequently a decided nuisance is created along the stream below the outlet and there are complaints against these conditions by farmers and property holders.

PROPOSED NEW OUTLET.

The only new outlet, proposed in connection with the present sewerage work, is that for an 8-inch sewer, 500 feet long, to be built in South William Street, which is now being paved, and which will discharge into Flat Rock Creek, in the southerly part of the town and one-half mile or more above the main outlet. As this sewer is to drain only the surface water from 500 lineal feet of street, it is not likely that it will ever create a nuisance; although a certain amount of street washings may be deposited along the bank of the creek. This, however, would not be offensive.

This report was referred to the Board and the proposed 8-inch storm water sewer 500 feet long, in South William Street, with outlet into Flat Rock Creek near the foot of said street, was approved, November 4, 1905,

provided that the council of Paudling first pass an ordinance and file a copy thereof with the secretary of the State Board of Health, forbidding the tapping of this sewer for the purpose of admitting household wastes of any kind.

The Board also advised that the discharge of sewage into Flat Rock Creek below town was creating a nuisance and that provision for purifying the sewage should be made as soon as possible; also all new sewers should be of the type best adapted for use in connection with sewage purification works, and that they should be so constructed that all sewage from the village could be collected at one point.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR RAVENNA.

The consulting engineer for the village of Ravenna, Mr. W. E. Myers of Kenton, submitted plans for sewerage and sewage purification for Ravenna, May 12, 1905. This village was visited by the engineer of the Board on May 15, 1905, and the following report was made:

Ravenna is a village of about 5,000 inhabitants, located in Portage County on Break Neck Creek, a tributary of the Cuyahoga River. Break Neck Creek does not pass directly through the village, however, but is located about one-half mile west of the corporation and the village drainage reaches it by means of ditches. Below Ravenna, Break Neck Creek flows through fairly uninhabited territory for a distance of some six or seven miles and then discharges into the Cuyahoga River immediately above the village of Kent.

At present there are few or no public sewers in Ravenna, and the several small ditches which pass through the town receive large quantities of domestic sewage and also the waste liquors from a woolen mill belonging to the Cleveland Woolen Mills Company, with the effect that the ditch below the village is highly polluted and has been the cause of complaints and law suits.

According to the plans presented the domestic sewage of the entire built-up portion of the village is to be collected by means of two main sewers, each 15 inches in diameter, and conveyed to purification works located in the extreme southwesterly portion of the corporation. The effluent from the purification works is to be discharged into a ditch or small intermittent stream, through which it will flow about one mile to Break Neck Creek.

The plans call for some twenty miles or more of sewers, fourteen miles of which will be 8 inches in diameter, and it is the intention to build seventeen miles immediately. It is expected that 4,000 people living in about 800 houses, will use the sewers immediately or in the near future,

and that the total flow of sewage after the seventeen miles of sewers are built, including the wastes from the woolen mill, will be 650,000 gallons daily. The ultimate number of people which can use the system, as designed, is estimated at 12,000; and the ultimate capacity is estimated at 10,000,000 gallons per day. The sewers will be underdrained where necessary and will be ventilated through perforated manhole covers in the streets and through soil-pipes in the houses. Automatic flush tanks will be provided where necessary.

The site proposed for the purification works comprises about four acres, located in the southwesterly portion of the corporation immediately south of the old location of the Baltimore and Ohio Railroad and about 500 feet west of Diamond Street.

The purification system consists of septic tanks and contact beds. The septic tanks will be two in number, one of which will be located on the westerly main sewer not far from the center of the village and nearly a mile from the site proposed for purification works. This is done simply to obtain a greater fall through the proposed works and as the tank is to be covered there can be no objection to placing it as proposed. The other tank will be located immediately adjacent to the contact beds.

The exact arrangement and design of the septic tank and contact beds have not yet been definitely decided upon. The essential features, however, are shown on the plans. The septic tanks will each hold about 8 hours flow, based on a total flow from the entire village of 650,000 gallons per day, and enough filtering material will be provided in the contact beds so that these beds will be operated at a rate not greater than two cycles or contacts per day.

The Board, May 26, 1905, approved the plans for sewerage and sewage purification for Ravenna, as shown upon drawings submitted by Mr. Myers on May 12, 1905, provided:

1st. That the waste liquors from the Cleveland Woolen Company's mill be treated in a manner satisfactory to the State Board of Health before being discharged into the purification works.

2d. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used, and.

3d. That the purification works be built before any of the proposed sewers are used.

REPORT ON PROPOSED SEWERS FOR STEUBENVILLE.

WASHINGTON AND NORTH STREET SEWERS.

The clerk of the council of Steubenville, Mr. T. W. Vance, made application for the Board's approval of two proposed sewers, one in Washington Street and one in North Street. Steubenville was visited by the engineer on May 18, 1905, and the following report was made:

Plans have not yet been submitted showing the exact location of these sewers, but the city engineer promised to submit these plans later. Both outlets are to be two miles below the Steubenville waterworks. The material of these sewers will be decided upon when it is found, through competitive bidding, whether brick or pipe is the cheaper.

Washington Street Sewer. This sewer is to be about 3,000 feet long, the upper 300 feet being 30 inches and the remainder 36 inches. It will receive domestic sewage from several hundred people; the storm water from about 1.5 miles of streets; cellar drainage, and the flow of a spring which will enter it at its upper end.

The outlet will be at the foot of Washington Street and will be so constructed that the dry weather flow will be discharged through an iron pipe below the lowest level of the river.

North Street Sewer. This sewer is to be about 3,000 feet long, the upper 300 feet being 30 inches and the remainder 36 inches. It will receive the storm water from 1.5 miles of streets and about the same amount of sewage as the Washington Street sewer; and the dry weather flow will be conveyed below the lowest level of the river, as with the Washington Street sewer. The outlet will be at the foot of North Street.

These sewers, to discharge into the Ohio River at the foot of Washington Street and North Street, respectively, and to have outlets so constructed that the dry weather flow would be discharged below the lowest level of the river, were approved by the Board on May 24, 1905.

ADAMS AND LOGAN STREET SEWERS.

The city engineer of Steubenville, Mr. C. B. Curfman, on July 8, 1905, submitted general and detailed plans showing proposed sewers in Adams and Logan streets. The engineer of the Board having visited Steubenville on May 18, 1905, and being familiar with the general conditions governing this application, made the following report:

Steubenville has at present very few sewers compared to the size of the city. The present total length is probably not more than three or four miles. The need of better sewerage has been very apparent for many years, though on account of paved streets and good grades the people have succeeded in getting along without them. The paved streets are used in several places for the discharge of sink drainage if not water-closets, but as most of the streets running east and west have a stream of spring water flowing through them, this practice has not resulted in causing as bad conditions as it usually would in other places. The fact of the spring water flowing over the paved streets in winter, however, causes much annoyance and necessitates considerable expenditure in order to keep the streets free from ice.

Adams Street Sewer. It is now proposed to construct similar sewers in Adams and Logan streets to those approved by the Board in Washington

and North streets. The Adams Street sewer is to be of brick, 36 inches in diameter and about 4,000 feet long. When its proposed laterals are built it will receive the domestic sewage from about 2,000 people, the storm water from about 2 miles of streets, covering an area of 55 acres, cellar drainage and the flow of spring water which is to enter it at its upper end.

This sewer will discharge into the Ohio River at the foot of Adams Street and the outlet will be so constructed with iron pipe that the dry weather flow of sewage will be discharged below the lowest level of the river at all times.

Logan Street Sewer. This sewer is to be of brick, 36 inches in diameter and about 2,200 feet long. It will receive, when its laterals are built, the domestic sewage from about 1,000 people, the storm water from about one mile of streets, covering an area of 20 acres, cellar drainage, and the flow of spring water which is to enter at its upper end.

This sewer will discharge into the Ohio River at the foot of Logan Street and the outlet will be so constructed with iron pipe that the dry weather flow of sewage will be discharged below the lowest level of the river at all times.

When sewage purification becomes necessary at Steubenville it will probably be more economical to construct an entirely new system of pipes for house sewage only, because the large amount of spring water from the easterly portion of the city, which must be taken care of in the combined sewers, would make sewage purification unnecessarily expensive. In view of the fact, however, that the discharge of sewage into the Ohio River occurs in other states as well as in Ohio, the plan now proposed will probably not be objectionable, at least for many years.

The Board, on July 17, 1905, approved the 36-inch brick sewer in Adams Street, and the similar sewer in Logan Street, as shown on plans submitted July 8, 1905, to discharge into the Ohio River at the foot of Adams Street and Logan Street respectively, and to have outlets so constructed that the dry weather flow would be conveyed below the lowest level of the river at all times.

REPORT ON PROPOSED SEWERAGE FOR SEWER DISTRICTS NO. 41 and NO. 42, TOLEDO.

At a regular meeting of the State Board of Health held October 25, 1905, plans for proposed sewerage for sewer districts numbers 41 and 42 were submitted for approval by Mr. F. I. Consaul, the city engineer. These plans were referred for investigation and report to a committee of two, consisting of the president and engineer of the Board. This committee inspected the territory covered by the sewer districts in question on November 1, 1905, and the following report was made:

GENERAL CONDITIONS.

The present sewers of Toledo are all on the combined plan and have a total length of about 200 miles. Each outlet sewer has been built with the idea of accommodating only a comparatively small district and no general plan for the entire city has been followed. The city has at present some forty sewer districts, each of which has one or more outlet sewers. All these sewers discharge into the Maumee River, Swan Creek, or into the Ottawa River, also called Ten Mile Creek. In the case of one district only, District No. 36, discharging into Swan Creek, have sewage purification works been installed.

Maumee River. This stream receives by far the largest portion of the city's sewage, there being some 22 outlets discharging into it from both the east and west sides of the city. The large volume of water available for the dilution of this sewage has prevented any gross contamination. The Toledo water supply is taken from this river near the southerly part of the city, but above all the sewer outlets. Nevertheless, a sufficient rise in the level of Lake Erie will cause slack water in the Maumee River as far up as the waterworks. When the proposed city filtration plant is completed, however, the danger of a contaminated water supply will be practically eliminated.

Swan Creek. This stream passes through the southwesterly portion of the city, flowing in a northeasterly direction, approximately parallel to and one mile distant from the Maumee River, into which it finally discharges at a point near the center of the city. The watershed of the stream above the city is about 180 square miles; which area probably yields a dry weather flow in the stream of only 4 to 6 cubic feet per second. At times, according to the investigations of the late expert engineer commission of the Toledo water supply, the flow of the creek amounts to practically nothing.

This stream now receives the drainage from the outlet sewers of six sewer districts, covering about 4 square miles. District No. 36 is provided with a sewage purification plant. The backwater influence from the lake extends from one to two miles above the mouth of the stream so that most of these sewers are discharged into deep water and do not create, it is said, very objectionable conditions; although the fluctuation in the lake level causes mud flats, containing offensive deposits, to be exposed more or less frequently. Flats near the mouth of the Maumee and Ottawa rivers are exposed in a similar manner.

The mouth of Swan Creek, or its junction with the Maumee River, is three or four miles below the waterworks intake, so that the influence upon the public water supply of sewage discharged into this stream is very small; especially as compared to that from sewers discharging directly into the Maumee River.

Ottawa River. This stream passes across the northwesterly corner of the city and forms, in part, the northerly corporation line. The stream

above the city has a watershed of about 90 square miles, which area probably yields a dry weather flow of 2 to 3 cubic feet per second. At present the sewage from the four districts having a total area of 3 or 4 square miles is discharged into this stream at three different points. As yet these sewers receive only a small amount of sewage, although with the present rapid growth of this section of the city it is probable that the amount of sewage will be considerably increased in the near future. Ottawa River discharges into the Maumee Bay at the Michigan and Ohio state line about 3 miles north of the city limits. The backwater influence from the lake extends fully 6 or 7 miles above the mouth of this stream. The lower two of the four sewer outlets for this reason discharge into deep water, while the remaining two are above the lake influence.

PAST ACTIONS OF THE BOARD.

Most of the sewers in Toledo were built before 1893, in which year it became the duty of the State Board of Health to pass upon proposed sewerage plans; but since 1893 sewerage plans for several new districts have been acted upon by the Board. These are described briefly as follows:

Actions Relative to Sewer Outlets Into the Maumee River. Sewer District No. 25; small district in southeasterly portion, near Fassett and Oak streets; one main outlet discharging into easterly side of the Maumee River under highway bridge at Fassett Street.

Sewer District No. 13; small district in the south-central portion of the city; one main outlet at the foot of Thayer Street a short distance below the waterworks; approved April, 1896.

Sewer District No. 29; located in the extreme northerly portion of the city on the easterly side of the river; one main outlet discharging into the westerly side of the Maumee River at the foot of New York Avenue; approved February, 1898.

Sewer District No. 30; located in the east-central part of the city, between the easterly shore of the Maumee River and the easterly city corporation line; one main outlet at the foot of Paine Street; approved February, 1898.

Sewer District No. 28; in the easterly side of the city, lying between the Maumee River and the easterly corporation line, one main outlet discharging at Port Clinton turnpike opposite the central part of the city of Toledo; approved May, 1898.

Sewer District No. 33; in central or business portion of city on westerly side of river, covering portions of several old sewer districts; one main sewer to discharge at the foot of Adams Street; approved May, 1898.

Sewer District No. 32; small district in the extreme northeasterly portion of the city between the easterly shore of the Maumee Bay and Duck Creek; one main outlet at the foot of Jessie Street; approved November, 1898.

Sewer District No. 34; central part of city on east side of river; one outlet at the foot of Treadwell Street; approved December, 1899. This district was included in District No. 39. See below.

Sewer District No. 35; small area in extreme northeasterly portion of city, on river; one outlet between Lasalle and Mackinaw streets; approved December, 1899.

Sewer District No. 37; district in northeasterly part of city and west of river and includes all or a part of old District No. 19; one main outlet at the foot of Columbus Street; approved February, 1903.

Sewer District No. 39; northeasterly portion of city east of river; one main outlet, 93 inches in diameter at the foot of Treadwell Street; approved 1903, subject to the condition "that if in the future examination of the water near the outlet, made by the State Board of Health, shows dangerous pollution a purification plant shall be at once installed."

Actions Relative to Sewer Outlets in Swan Creek. Sewer District No. 31; small district in the extreme southwesterly portion of the city immediately north of Swan Creek; one outlet into this stream approved November, 1898, with the condition that the Board "reserve the right to condemn said outlet and abolish it whenever it shall be shown that the discharge of sewage at this point is the cause of a nuisance detrimental to the health of the public."

Sewer District No. 36; also called Walbridge Park District; large area lying between the Maumee River and Swan Creek in the southwesterly portion of the city. Sewer outlet for this district was disapproved in April, 1901, and again disapproved in August, 1901, "unless the sewage be purified in a manner satisfactory to the State Board of Health." Plans for sewage purification at this district having been prepared and submitted to the Board early in 1904, these plans were approved in April, 1904, provided "that whenever the population using the sewers becomes greater the disposal plant be enlarged and in such manner as the State Board of Health may deem necessary."

A fifty-five acre district bounded by Swan Creek on the north and west, by the Miami and Erie Canal on the east, and by the L., S. and M. S. Railroad on the south; one main sewer discharging into Swan Creek at City Park Avenue bridge; plans approved November, 1901.

Actions Relative to Sewer Outlets Into the Ottawa River. Auburndale District; comprises some 300 acres in northwesterly portion of the city, bounded by the westerly corporation line on the west and by the Ottawa River on the north. Two main outlets proposed, one a few hundred feet east of the city line and the other at the foot of Third Street; outlets disapproved January, 1896.

Sewer District No. 26; easterly portion of Auburndale district described above; one main outlet, for domestic sewage only, at the foot of Third Street; approved "as a temporary expedient," October, 1896. This sewer has not been built as planned. Revised plans approved conditionally later. See below.

Sewer District No. 27; westerly portion of Auburndale district described above; one combined sewer outlet into the Ottawa River a few hundred feet east of corporation line, approved "as a temporary expedient," October, 1896. This sewer has not been built as planned. Revised plans approved conditionally. See below.

Sewer District No. 27; proposed modification of plans approved as above, which modification was to have consisted in the discharge of sewage from the southerly portion of the district into a ravine in Valley Street. This modification was disapproved in May, 1900.

Sewer District No. 16. Sub-district No. 1; located in the north-central portion of the city immediately south of the Ottawa River. Two proposed main outlets, one to discharge into Ottawa River immediately east of Detroit Avenue bridge; the other to discharge into Ottawa River near the corner of Blanchet Street and Manhattan Road; both these outlets to discharge into slack water caused by the lake. Approved August, 1903.

Sewer District No. 26; plans for an outlet for this district again submitted to the Board in October, 1903; approved "upon the condition that if in the future, examination of the water near the outlet, made by the State Board of Health, shows dangerous pollution a purification plant shall at once be installed," October, 1903

Sewer District No. 27, plans for this district again submitted October, 1903, this time calling for combined sewers instead of sanitary sewers. Outlet approved October, 1903, subject to the same condition quoted immediately above for district No. 26.

Sewer District No. 40; location in the extreme northwesterly portion of the city, northwest of Ottawa River, opposite districts No. 26 and No. 27; the outlet of this district into Ottawa River approved October, 1903, subject to the same conditions imposed for districts No. 26 and No. 27 on the same date.

PROPOSED PLANS.

Sewer District No. 41. This district covers an area of 50 acres and is located in the southwesterly portion of the city near the junction of Western Avenue with Swan Creek. All of the district lies on the easterly and southerly side of the creek, and was formerly considered a part of Sewer District No 20; but the topography will not admit of an economical draining of this new district in the outfall sewer at District No. 20.

It is proposed to construct at present about 850 feet of pipe sewer, 12 to 15 inches in diameter, to discharge through a short 30-inch outfall sewer into Swan Creek at a point about one hundred feet north of Western Avenue. Most of the proposed sewer will be located in Beecham and Spencer streets; upon which streets there are at present 16 houses, all of which will probably connect with the sewers immediately. When this sewer district is thickly built up, however, judging from the character of the houses which are being built at present, it will contain some 2,500 people. Besides

receiving the domestic sewage, the proposed sewer will be used for storm water also, thus making it a combined sewer. The location for the proposed outlet is near the upper limit of backwater influence from the lake. The current is therefore, sluggish, but the water is deep. The nearest house to the proposed outlet is 300 feet distant. One mile above this point is the outlet for the sewage purification works for District No. 36. A few hundred feet below this point is the outlet for the large district No. 18. It is claimed that no serious nuisance is created on account of this outlet.

The sewer just described and proposed for immediate construction will not, on account of the topography, accommodate this entire district. Another outlet for a 24-inch combined sewer into Swan Creek, for the northerly part of this district, at a point 200 feet west of the Michigan Central Railroad bridge, is desired. This outlet will not, however, be built for some time.

Sewer District No. 42. This district is located in the northwesterly portion of the city, being bounded on the east by the Michigan Central Railroad, on the south by Central Avenue and on the west and north by the Ottawa River. The total area of the district is 140 acres. It is proposed to drain this area by means of combined sewers, as has been the practice in all other sewer districts of the city. On account of the size and topography of the district it is thought to be impracticable to drain all the sewage to one point. Two outlets, therefore, are proposed.

One outlet is to drain Sub-district No. 1 and discharge into Ottawa River at a point 800 feet north of Central Avenue near the southerly portion of the main district. On the opposite side of the stream from the proposed point of discharge is property which is or will be used for park purposes. On the same side of the stream are a half dozen houses within a few hundred feet of the outlet.

The outlet will be several hundred feet above the backwater influence from the lake and very little dilution of the sewage will be obtained. The location proposed is below the outlets of districts No. 26, No. 27 and No. 40, already approved conditionally, and above the outlet from District No. 16 (discharging into deep water) already approved.

The sub-district comprises about 40 acres and includes most of the present built-up portion of the main district. About 750 feet of 30-inch brick sewer will be built immediately and into this will be discharged the sewage from forty houses, containing a population of over 200.

It is proposed to drain the northerly or greater portion of the district through a 36-inch brick sewer to discharge into Ottawa River near the northern boundary of the district and below the park property.

This report was referred to the Board November 16, 1905, and the plans for proposed sewerage for sewer districts No. 41 and No. 42 of Toledo, as shown upon drawings submitted to the State Board of Health on October 25, 1905, by F. I. Consaul, city engineer, and as described by him in accompanying information, were acted upon as follows:

1st. The proposed sewerage for that portion of District No. 41, which, according to the plan submitted is to discharge through an outlet to be located on the east bank of Swan Creek a few hundred feet north of the Western Avenue bridge, was approved, provided that the dry weather flow, at least, be discharged through a submerged pipe, and that whenever this outlet becomes, in the opinion of the State Board of Health, a nuisance, provision shall immediately be made for disposing of sewage being discharged thereat, in a manner satisfactory to said Board.

2d. The question of approval of the proposed 24-inch outlet for the northerly part of this district was postponed until this outlet is needed and plans for its construction have been definitely made.

3d. The proposed sewerage for Sub-district No. 1, of the main Sewer District No. 42, was approved, provided that the outfall sewer for this sub-district be extended down the Ottawa River to a point well beyond land which is to be used for park purposes and that the dry weather flow at least be discharged into deep water through a submerged outlet; and provided, also, that whenever this outlet becomes, in the opinion of the State Board of Health, a nuisance, provision shall immediately be made for disposing of the sewage being discharged thereat, in a manner satisfactory to the State Board of Health.

4th. The question of approval of the proposed 36-inch outlet for the northerly portion of this district was postponed until this outlet is needed and plans for its construction have been definitely made.

The board of public service of Toledo, through its engineer, was advised that the plan of building combined sewers with a large number of separate outlets, especially in those districts which drain into Swan Creek and Ottawa River, was distinctly opposed to the economical solution of the problem of collecting and disposing of the sewage from these drainage areas; that the growth of the city would require, before long, the building of intercepting sewers in the valleys of Swan Creek and Ottawa River and doubtless this sewage, collected by these sewers, would have to be purified in some manner; that purification would be made much more difficult by the use of the combined system of sewers instead of the use of a separate system, by which domestic sewage only would be conveyed to the purification works, and furthermore that the size, and hence the expense of an intercepting sewer, if large quantities of storm water were to be carried, would be many times greater than the size necessary for an intercepting sewer to convey the domestic wastes only.

REPORT ON PROPOSED SEWERAGE AND SEWAGE PURIFICATION FOR URBANA.

July 31, 1905, Messrs. Young, Fardwell and Hooke, of St. Louis, Missouri, submitted plans for proposed sewerage and sewage purification for Urbana. The engineer visited Urbana on August 1, 1905, made the necessary inspection of the territory involved and the following report was made:

The plans provide for a domestic sewerage system covering the entire built-up area of the corporation. This system comprises over 25 miles of sewers varying from 6 inches to 15 inches in diameter. The sewers are designed to care for the sewage of 12,000, which is the estimated population of the city twenty years hence. The quantity of sewage which can be taken care of by the system is 500,000 gallons per day while 80,000 gallons is expected immediately after constructing the sewers. It is thought that an entire system of trunk sewers will be built within the next two years and that there will be some 350 sewer connections immediately after construction. These connections will include eighty stores, hotels, schools and public buildings.

Cellar drains will be connected with these sewers. On account of the gravelly formation beneath the city, little ground water leakage is expected and therefore sub-drains beneath the sewers are not provided for. The sewers are to be ventilated through perforated covers over all manholes and lamp holes.

The sewage from the entire city will be collected in a 15-inch main sewer and conveyed to a point about one mile west of the corporation boundary to a site selected for the sewage purification plant. An option on this site has been obtained by the village. The site comprises 6 acres and is located south of the P., C., C. and St. L. Railroad near the crossing of Mad River pike over this railroad. Dugan Brook passes near the northerly boundary (between the site and the railroad) and also near the westerly boundary, and this stream will receive the effluent from the purification works.

Across the brook in a westerly direction is a large settling basin or pond owned by the strawboard company located in Urbana. This pond is used as a receiving and storage basin for the strawboard wastes and the gates controlling it are opened at intervals when the stream is high and the wastes are allowed to escape into Mad River. The pollution of this stream by these wastes has been the cause of much complaint on the part of the farmers living along the stream below.

The sewage purification works will consist of grit chamber, septic tanks, sludge beds and contact beds automatically controlled. The nominal capacity of the works as they will be built at first is 200,000 gallons per day. This will provide for 3,000 or 4,000 people or about one-half the present population of the village. Judging from the experiences of other

cities similar in size and character to Urbana, not more than 50 per cent. will use the sewers within ten years. The works are so designed that additions can be easily made when necessary.

The grit chamber is 10x12x4 feet and has an outlet at the bottom connecting with the sludge bed.

The septic tanks to be built at present are 3 in number; each is 65 feet long, with an average depth of 8 feet 3 inches. Two are 12 feet wide, while the third is 16 feet wide. The combined capacity of the three is 150,000 gallons. This design enables the tanks to be used either in parallel or in tandem; and with a flow of 200,000 gallons, septic periods ranging from 5 1-2 hours up to 19 hours may be obtained. Outlets are provided at the bottom of the septic tank by means of which the sludge may be drawn off and discharged upon the sludge bed.

The contact beds are to be four in number, each 50x100 feet and containing 2 feet and 9 inches of broken stone, 3-4 to 1 1-2 inches in size, on top of which is to be placed 6 inches of clinkers 1-4 to 1 inch in size. With a daily flow of 200,000 gallons, these contact beds will operate at an average rate of 1 1-2 cycles per day or 430,000 gallons per acre per day with the depth, as designed, of 2 feet 9 inches.

The working of the beds is to be controlled automatically by the Merritt air-lock system. It is said that this system may be adjusted so that the sewage will be retained in the beds for the proper period, which is to be determined by experiments, and that after the bed is discharged the outlet remains open until the next dose is applied and in this way thorough aeration of the beds is secured. The chief objection to a system of this type is the possibility of freezing if not properly protected and also a possibility of leaks in the air pipes which would disarrange the apparatus. If carefully installed and watched, however, it would probably be quite satisfactory.

This report was referred to the Board and on October 17, 1905, the plans, as submitted July 31, 1905, were approved, subject to the following conditions:

1st. That the sewage purification works be built before any of the proposed sewers are put into service.

2d. That the size of the sewage purification works be increased when deemed necessary by the State Board of Health.

3d. That the method of operating the sewage disposal works be subject to the approval of the State Board of Health.

4th. That the automatic controlling device, and all pipes constituting a part thereof, be enclosed by a suitable building or otherwise carefully protected from freezing; and,

5th. That samples of all filtering material be submitted to and receive the approval of the State Board of Health before being used.

REPORT ON PROPOSED SEWERS FOR WAUSEON.

On September 25, 1905, it came to the attention of the Board that the village of Wauseon was about to construct sewers with new outlets; and on October 6, 1905, that village was visited by the engineer of the Board who inspected the present sewers as well as the locations for the proposed outlets. On October 18th, a plan, showing present and proposed sewers, was submitted by Mr. Howard Lyon, chairman of the village council sewer committee. The following report was made:

PRESENT CONDITIONS.

Wauseon is a village of about 2,500 inhabitants and is the county seat of Fulton County. It is located upon the north branch of Turkeyfoot Creek, a small and probably intermittent stream which ultimately flows into the Maumee River.

Wauseon has a water supply derived from wells located about a mile south of the village. The water is very generally used by the inhabitants. Modern plumbing is being installed in most of the houses.

At present there are about 6 miles of combined sewers consisting largely of field tile, which discharge into ditches leading to the north branch of Turkeyfoot Creek or into the creek direct. The present sewers are described in a general way as follows:

The northwestern portion of the village is fairly well provided with sewers, consisting of two main sewers and several laterals. These discharge into the creek at a point about 500 feet south of the Wabash Railroad and 300 feet east of Main Street and create a nuisance.

A sewer about a half mile in length discharges, opposite the southerly end of Main Street, into a county ditch just south of the corporation line. The outlet for this sewer is within a few hundred feet of a farm house.

The County Road or Depot Street sewer discharges into the creek at the County Road bridge. This sewer is 1 1-2 miles in length and probably receives more sewage than any of the others, there being about 50 houses connected with it. The outlet of this sewer by the side of the highway was creating very foul conditions at the time of inspection and was a decided nuisance to those passing over the bridge as well as being dangerous to the health of the occupants of houses a few hundred feet distant.

The Leggett Street sewer is nearly a mile long and discharges into a small ditch just east of the easterly corporation line. This ditch enters the North Branch of Turkeyfoot Creek about 2,000 feet further east. The water in the ditch near the sewer outlet is stagnant and the sewage causes a very decided nuisance and gives rise to offensive odors. The Leggett Street sewer is at present receiving drainage from a milk condensing plant, which adds to the pollution. It is intended, however, to connect this plant with the proposed sewer in Chestnut Street, as described below, when the latter is built.

The Brunel Street sewer is about one-half mile long and discharges into a dry ditch adjacent to a barnyard, a few hundred feet south of the junction of Brunel and Leggett streets. This sewer is said to receive the drainage from 15 or 20 houses. It causes a decided nuisance in the vicinity of its outlet. It is proposed to extend this outlet further down the ditch in a manner to be described below.

It will be seen from the foregoing that the sewerage of Wauseon has been installed regardless of any system and that the small water courses in the vicinity are being badly polluted. Probably from 500 to 800 people are now connected with the sewers; and, due to the increasing use of the public water supply, the amount of sewage to be disposed of is increasing. It is essential to the health of the village that a proper sanitary system with sewage purification works be constructed.

PROPOSED WORK.

It is proposed to construct a 12-inch or 18-inch pipe sewer about three-fourths of a mile long in the easterly portion of Chestnut Street, with an outlet into the same ditch, west of town, which is already badly polluted by the Leggett Street sewer outlet, described above. This sewer will ultimately drain all of the so-called Sewer District No. 3, which contains at present about 75 houses. It will also receive the drainage from the milk condensing plant.

It is also proposed to extend the Brunel Street sewer, which now discharges into a dry ditch and creates a serious nuisance within a hundred feet of a dwelling, to a point about 200 feet further down the ditch, where it will discharge upon the property of another person. This extension simply amounts to the transferring of the nuisance. In the proposed location, as well as in the present location, the outlet is decidedly objectionable; although by the proposed extension the outlet will be further removed from any dwelling house. Such an extension, however, would only serve to postpone the time of applying the final and proper remedy.

This report and the plans were considered by the Board at its meeting held October 25, 1905, and the plans for a sewer in the easterly portion of Chestnut Street (Sewer District No. 3), with outlet into a ditch a few feet east of the corporation line were disapproved.

The proposed extension of the sewer discharging into a dry ditch at a point a few hundred feet south of the junction of Leggett and Brunel streets was also disapproved.

The village authorities were advised that their method of disposing of the sewage of Wauseon was dangerous to the health of the inhabitants of the village, as well as to persons living along the creek below town, and that plans, satisfactory to the State Board of Health, for a proper system of sewerage for house sewage only, including a provision for sewage purification, should be prepared and that all future sewers should be built in accordance with this plan. They were further advised that the use of the

sewers for domestic sewage should, as fast as practicable, be discontinued and the houses now discharging therein should be connected to proper domestic sewers leading to a purification plant; and that the sewers could be, unobjectionably, continued in use as storm sewers.

MISCELLANEOUS REPORTS

REPORT OF AN INVESTIGATION OF THE POLLUTION OF
POE DITCH, AT BOWLING GREEN.

Communications were received from Mr. J. D. Anderson, health officer of Center Township, and Mr. W. W. Dunipace, health officer of Webster Township, both of which townships are in the vicinity of Bowling Green, making complaint of the pollution of Poe Ditch and of the North Branch of the Portage River. The engineer visited Bowling Green on July 20, 1905, made an inspection of the conditions and reported as follows:

It appears that Bowling Green has about five miles of storm sewers and nearly the same length of sanitary sewers. The storm sewers, however, receive domestic sewage in addition to storm water and street washings. It is said that upon many of the sewer connections with the storm sewers, as well as with the sanitary sewers, catch basins are placed in order to keep as much solid matter as possible from entering the sewers. These catch basins are cleaned out at intervals. It is probable that about 1,000 persons, or one-fifth of the entire population, make use of the sewers.

The sewage is discharged through private as well as through public sewers, either directly or through tributary ditches, into the Poe Ditch, which is an artificial channel parallel to the Poe Road and extends in an easterly and westerly direction across the northerly part of the corporation of Bowling Green and discharges into the North Branch of the Portage River at a point three miles east of the city corporation line, in the extreme southwest corner of Webster Township.

Immediately adjacent to Poe Ditch below the sewer outlets, both within the corporation and within Center Township, are fifteen or twenty houses; while along the North Branch of the Portage River, within four miles of the outlet of Poe Ditch and within a short distance of the stream, are sixty to seventy houses. The river passes through pasture land and is used to some extent for stock watering. It is stated by the health officer of Webster Township that there have been many deaths from typhoid fever in houses along the Poe Ditch and the river below the outlet.

A few years ago a tile pipe was laid under the bottom of the ditch in order to drain it during dry weather, and thus abate the nuisance. This has only been partially successful, however, and the water appears to flow out of the tile and into the ditch at places, and at other places from the ditch into the tile. The tile discharges into the Portage River a few feet north of the ditch outlet. The flow in it is diluted, at least at certain periods, by field drainage.

The ditch, especially at its upper part, is very offensive both as to sight and smell. Persons living near it complain bitterly of its condition, and with good reason. In 1900 the State Board of Health approved plans for sewerage for the village of Bowling Green, drawn by Messrs. Riggs

and Sherman. These plans were approved subject to the following conditions:

1st. That present sewers now (in 1900) in use be abandoned for carrying house drainage.

2d. That provision be made for purifying the sewage in a manner satisfactory to the State Board of Health within three years' time from the completion of the main outlet sewer.

The investigation showed that a large quantity of sewage was being discharged into Thurston Ditch, at or very near the point approved as an outlet subject to the above conditions. The Thurston Ditch enters Poe Ditch about 800 feet below this outlet. The pollution of both ditches in this vicinity is very great.

It is seen from the foregoing that Bowling Green ought to have installed a purification plant in 1903, according to the conditions of approval. This has not yet been done; but it is understood that steps have been taken towards making plans for such works. In fact, the immediate reason for complaint is that the board of public service is considering plans for sewage purification works, which plans are, in the opinion of the health officer of Webster Township, inadequate for the work which will be required of them. These plans have not yet been submitted to the State Board of Health.

A copy of this report was sent to the health officers of Center and Webster townships, July 26, 1905, and the following communications was sent to the board of public service:

"In October, 1900, the Board approved sewerage plans for Bowling Green with the following conditions:

" '1st. That present sewers now in use be abandoned for carrying house drainage.

" '2d. That provision be made for purifying the sewage in a manner satisfactory to the State Board of Health within three years' time from the completion of the main outlet sewer.'

"It appears that sewage purification works have not yet been installed although, according to the conditions of approval of this main sewer outlet at Bowling Green, this should have been done two years ago. I understand, however, that your board is taking preliminary steps toward installing such works, and would call your attention to the fact that when these plans are completed they must be submitted to the State Board of Health for approval.

"The discharge of unpurified sewage into the Poe Ditch and the North Branch of the Portage River under present conditions is very undesirable and unhealthful to those living along these streams, both within and without the corporation.

"This Board will expect some proper action to be taken for the abatement of this nuisance without unnecessary delay."

At a meeting of the State Board of Health, held August 16, 1905, Mr.

Dunipace and Mr. Anderson asked the Board's assistance in the abatement of this nuisance, stating that a number of cases of typhoid fever had occurred in their townships which it was believed had been caused by this sewage pollution.

The secretary was instructed to refer the matter to the attorney general for an opinion as to whether the local board of health or the State Board of Health had authority to compel Bowling Green to take the necessary steps to abate the nuisance.

The attorney general advised that the incoming Legislature be requested to broaden the powers of the State Board of Health so as to more easily deal with similar cases.

REPORT OF AN INVESTIGATION OF AN OUTBREAK OF TY-PHOID FEVER AT BOWLING GREEN.

Several cases of typhoid fever were reported at Bowling Green and the bacteriologist visited that place May 1 and 2, 1905, to determine, if possible, the cause of the outbreak. The following report was made:

Bowling Green is the county seat of Wood County and had a population of 5,067 by the 1900 census, but the city has grown considerably since. The city has a public water supply in general use and some sewers.

On arriving in the city May 1st, the writer accompanied by the health officer, Mr. J. B. Miller, visited the physicians and the usual data were secured from them or elsewhere. Twenty-six cases were found and this number does not include several "suspicious" cases that may have been typhoid in a mild form. So far, there has been one death.

The cases with date of attack (physician's first visit) and sources of water and milk supply are given below.

No. of case.	Date of attack.	Source of water.	Source of milk.	Remarks.
1	April 1	City.....	H. & K.....	Sister of No. 2.
2	April 1	City.....	H. & K.....	Sister of No. 1.
3	April 3	City.....	"Own cow, later lamb's	"
4	April 7	Buttles well..	H. & K.....	Brother of No. 10.
5	April 8	City.....	H. & K.....	Same house as No. 21.
6	April 8	Goit well....	H. & K.....	
7	April 8	City.....	H. & K.....	See Nos. 8 and 9.
8	April 8	City.....	H. & K.....	Wife of No. 7.
9	April 8	City.....	H. & K.....	Daughter of 7 and 8.
10	April 9	Buttles well..	H. & K.....	Brother of No. 4.
11	April 10	Houser well...	H. & K.....	In and out of city.
12	April 10	Houser well...	H. & K.....	Died; sister of No. 11.
13	April 10	City.....	H. & K. and store....	Sister of 14, 19 and 23.
14	April 10	City.....	H. & K. and store....	Brother of 13, 19 and 23.

No. of case.	Date of attack.	Source of water.	Source of milk.	Remarks.
15	April 10	McCrury well	H. & K.....	Same house as No. 22.
16	April 11	Mercer well.	H. & K.....	Milk used sparingly.
17	April 13	Mercer well..	H. & K.....	Child of No. 16.
18	April 13	Mercer well..	H. & K.....	Child of No. 16.
19	April 14	City.....	H. & K. and store...	Brother of 13, 14 and 23.
20	April 14	City.....	H. & K., also Fuller...	Niece of 24 and 25.
21	April 15	City.....	H. & K.....	Same house as No. 5.
22	April 16	McCrury well	H. & K. and store...	Same house as No. 15.
23	April 17	City.....	H. & K. and store...	Sister of 13, 14 and 19.
24	April 17	McCrury well	H. & K.....	Husband of No. 25.
25	April 18	McCrury well	H. & K.....	Wife of No. 24.
26	*April 24	McCrury well	H. & K.....	

*Sick for a week before this date.

These cases were located in the southwestern part of the city. The ages of the patients are shown on the accompanying plate A, the curve of cases as plotted by ages in 5 year periods is shown by B, the dates of attacks by C and the curve of cases by weeks by D.

Water as the Source of Infection.

As water is the most common source of infection in typhoid fever the drinking waters may be considered first. As noted by the local board of health, the cases are confined to the southwestern portion of the city in an area covering less perhaps than one-fifth of the corporation. The water-works plant with reservoir is located to the west and much of the city is supplied with water after this portion and from laterals from the same main line. There is no emergency intake to cause trouble at Bowling Green. With the typhoid cases restricted to one portion of the city, with only fifty per cent. of them using city water, while that same water reaches all parts of the city and is much used for drinking purposes, there is no evidence pointing toward the public water supply as the cause of the outbreak. However, in order to give assurance to the citizens, a sample of the city water was taken from the public supply at the Carpenter residence, where there were four cases of typhoid. Examination of this sample shows a good water for drinking purposes. (For analysis see laboratory report on water supplies.)

Of those not using city water, five cases used water from the McCrury drilled well, which was also sampled (4305) and the examination indicated that it was not the cause of typhoid fever.

Three cases used water from the Mercer well, but an examination of the sample (4280) from this well indicated that it was not directly receiving sewage pollution. Of the remaining wells supplying the other five cases, not one had over two patients using water from it. From the foregoing evidence it is plainly seen that this outbreak was not due to the water.

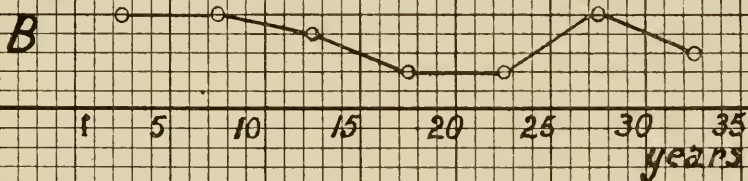
BOWLING GREEN TYPHOID

APRIL 1905

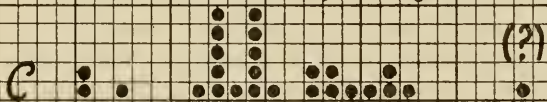
A. CASES BY AGES.



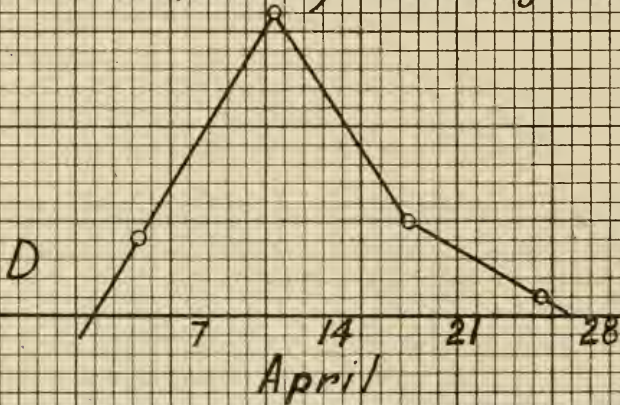
B Curve of cases by ages 5 year periods.



C Cases by days



D Curve of cases by weeks



Milk as the Source of Infection.

Looking at the plate A and B, it is seen that sixty per cent. of the cases are 20 years of age or younger, with the majority between 2 and 13 years of age. This is an unusually high percentage for the young in an outbreak of typhoid and is significant.

Pursuing the investigation along the line of schools there was no evidence to indicate the infection had aught to do with school conditions as seen by the general distribution below:

South building.....	4 cases
Church Street building.....	4 cases
Central building.....	2 cases
Rudolph School.....	1 case
Below school age.....	5 cases
Above school age.....	10 cases

A localized outbreak in a city under the conditions noted above, with so large a percentage of children among the cases, with the water and other occasional sources excluded, would point very strongly to milk as the source of infection even if there was no more direct evidence. In looking over the list of cases it is found that 25 out of 26 cases were users to a greater or less extent of the H. & K. milk, and the information obtained points conclusively to this milk as the source of the outbreak.

Conditions Concerning H. & K. Milk.

Mr. H. and Mr. K. are in partnership in the milk business. H. lives on the outskirts of the city and the cows are kept at his place and milked by two men. K. lives in the city, drives the wagon and keeps it and its equipment at his home, where the cans are washed. Examination of a small sample (4307) from the K. drilled well shows a potable water. No evidence was obtained that cast any suspicion toward the K. home as the source of infection.

Mr. H. was sick at his home with typhoid fever during the early part of the winter. His discharges were said to have been disinfected and then buried near the house, at a point above the cistern and the two wells on the place, and about 100 feet from the more distant or barn well. To those familiar with the trouble of completely disinfecting stools and urine it is apparent that here is an opportunity for infection although the intentions of the family were of the best. The house well has been used only for rinsing clothes on wash day since Mr. H.'s illness and is now abandoned. The dug well at the barn was found on examination, by a bacteriologist of Toledo some four weeks ago, to contain intestinal bacteria, and has been replaced with a drilled and cased well put down through the former dug well. Examination of a sample (4303) from this new well showed a

usable water at this time, although high in the number of bacteria, as is apt to be the case in a new well. Examination of a sample (4304) from the H. cistern failed to show the presence of intestinal bacteria although the water is not first class.

Another possible source of infection that should be noted is the urine of a typhoid convalescent since the bacilli are often present for a long period after the illness. Urination in the barn, as was practiced, was but a few feet from the barn well.

Under the conditions, as stated above, it should be noted that there was no infection for over two months after Mr. H. was able to be out succeeding his attack of typhoid fever. The cases began with the month of April and therefore the infection came in the latter half of March. It might be inferred that with the thawing weather, which came from about March 10th on, the infection resulted from the washing of discharges down the hill.

Mr. K. was afflicted with "shingles" and did not drive the wagon from about March 12th to March 25th, during which period the wagon was driven by Mr. H., kept at his barn and the utensils washed at the H. home, although it is said no water from the dug well at the barn was used in any way whatsoever. Considering the period of incubation of typhoid it is apparent that at least the first infections occurred during the time when the wagon was kept at Mr. H.'s and operated by him. From the end of the run by Mr. H., March 25th, to the date of attack of the last cases, April 18th, gives an incubation period of twenty-four days, which is rather long though held as possible by some authorities. Hence, it would appear that perhaps all of the infections were obtained during this period. There is no reason for believing the infection came about by the cows drinking impure water, and that the typhoid germs passed through the cows to appear in the milk. That there was not a general infection of all the H. & K. milk would appear from the fact that they used three large cans and always followed the route in a definite manner, but there was not a case developed on the last third of the route, while most of the cases were among the users from the first can.

One might conjecture as to how such an infection came about, but the exact manner in which the typhoid germs gained access to the milk cannot be determined. However, the time and the source are sufficiently well established.

On the other hand Messrs. H. & K., in a manner for which they are to be commended, asked advice of the local board of health and voluntarily abandoned their milk route on April 12, 1905. This was but six days before the definitely established date of the physician's first call on the last cases and is such a very short incubation that it would appear the infection had ceased (temporarily at least) prior to the time when H. & K. discontinued their milk route.

Possibility of Future Cases in the Infected District.

In the southwestern portion of the city there are but few sewer connections, and most of the houses where typhoid has prevailed make use of privy vaults. Unless there has been effective disinfection of the discharges additional cases may appear in that locality with the coming of flies at this season of the year. Again it is possible that some of the wells of the neighborhood may later become infected from these privies and lead to subsequent cases of typhoid fever. Strict precautions should be taken in the matter of the disinfection of the discharges of typhoid patients, and especially should attention be given to the urine even for weeks after the patient is up and around.

A copy of this report was furnished to the local health authorities and to the dairy company referred to in the report.

REPORT ON THE POLLUTION OF CERTAIN STREAMS IN THE VILLAGE OF BRATENAHL.

October 21, 1905, the village council of Bratenahl, through its clerk, Mr. Clifford A. Neff, requested that the attention of the State Board of Health be directed to the pollution of certain streams which pass through this village, with reference to improving existing conditions. On November 2 and 3, 1905, the engineer visited Bratenahl and, in company with the village engineer and the health officer, inspected the streams in question. The following report was made:

Bratenahl is a village located upon the shore of Lake Erie immediately north and east of the city limits of Cleveland. It covers a comparatively small area and is included between the tracks of the Lake Shore and Michigan Southern Railroad and the lake. It was formerly a part of the city of Glenville, but at the time of the recent annexation of this city to the city of Cleveland, Bratenahl was incorporated as a separate village. The population is about 600. The village is strictly a residential community; being occupied chiefly by well-to-do business men of Cleveland.

The streams which are the cause of complaint are Spring Brook, Dugaway Brook and Shaw Brook. These three streams pass, in the lower part of their course, through the village of Bratenahl and discharge into Lake Erie. The pollution of the streams comes from sources located outside of the village limits, in the city of Cleveland and the village of East Cleveland. A report upon the source of pollution of these streams has been made by a committee appointed by the village council of Bratenahl, consisting of the health officer and village clerk. A copy of this report has been submitted to the State Board of Health and was used in a general way as a guide toward making the present investigation.

Spring Brook. This stream may be classed as a ditch, through which water flows only at times. Its upper end is near the Glenville race track, about a mile south of Lake Erie. The lower part of its course lies within the village of Bratenahl. The point where this stream discharges into the lake is several hundred feet northeast of the boundary line between Cleveland and Bratenahl.

The pollution of the stream is occasioned almost entirely by the discharge of sewage and sink drainage from individual houses located near its course within the city of Cleveland and also by the dumping of rubbish and garbage into it. A 15-inch sewer has been built to discharge into it near St. Clair Street, but the outlet of this sewer was closed several months ago by covering it with soil; and evidently no considerable amount of drainage, of any kind, had been discharged through it for some time previous to the inspection.

It would seem that the condition of this stream could be greatly improved by strictly enforcing sanitary regulations regarding the dumping of garbage and rubbish, and also by causing as many of the houses as possible, which now discharge drainage into the stream, to connect with the city sewers.

Duganway Brook. This brook is a stream of considerable size in which there is always at least a small amount of water flowing. It is formed by two main branches, approximately parallel and about one mile apart, which originate a few miles southeast of the city limits and eight or nine miles from the lake. The easterly branch, in the upper part of its course above Euclid Avenue, passes through a country which is practically uninhabited, or is occupied by large estates. Below Euclid Avenue as far down as its junction with the westerly branch, this branch passes through a district in which it is likely to be polluted to a certain extent by private drains.

The westerly branch, above, or south, of Euclid Avenue, probably receives little or no pollution. Immediately south of Euclid Avenue it passes through Lake View Cemetery, in which there are several reservoirs which would probably tend to remove the effect of any pollution that might occur above this point. Immediately below Euclid Avenue, however, between this avenue and Superior Street, for a distance of a little over half a mile, this branch passes through a thickly populated section, occupied by a distinctly low class of dwellings. There are probably fifty to seventy-five houses located adjacent to the stream, in this district, nearly all of which have private drains, either for sink drainage or water closet drainage, or both, leading into it. In addition, there are several privies located immediately over the stream which doubtless cause serious pollution. The stream is also used as a receptacle for rubbish and refuse of various kinds. Just above Superior Street there is a 12-inch storm sewer discharging into the stream which receives domestic sewage from a dozen or more houses located in Oakland Street.

The westerly branch of Dugaway Brook at Superior Street, therefore, is badly polluted. Below Superior Street for a distance of about a mile and a half this stream is said to receive more or less pollution from private drains, although these drains were not inspected. A little more than a mile and a half below Superior Street this branch joins the easterly branch. Just below this point is located the sewage disposal plant of Glenville, which receives sewage from nearly the entire Glenville district. The actual number of persons tributary to this plant is estimated to be between 5,000 and 6,000.

The original plans for the Glenville sewage disposal plant were approved by the State Board of Health in 1897. These plans provided for purification of the sewage by chemical precipitation followed by contact treatment in coke beds and then by intermittent filtration through sand. Only one-half of the coke filters shown upon the original plans have been built and the same is true with respect to the sand filters; although the population connected with the sewers tributary to the plant has increased very considerably since the first few years that the plant was used.

The recent inspection of this sewage disposal plant showed that the only treatment to which the sewage was being subjected was its passage through the precipitation tanks. From the appearance of the effluent, this treatment was causing no marked degree of purification. It was apparent that the chemical treatment of the sewage was not continuous; as the attendant in charge of the plant was not on duty at the time of inspection and the lime mixing machinery was not working.

Furthermore, one of the coke contact beds was in a very foul condition while the other was completely filled with sewage and apparently so clogged that the sewage could not pass through. It appears from this and previous inspections that these coke beds are not operated upon the contact principle, as was originally intended; but that they are used simply as continuous strainers, which method could not be expected to produce purification.

The sand beds, designed for final treatment of sewage, it is understood, have not been used for several years and are now thickly overgrown with weeds. It is claimed that the material in these beds is too fine to allow the sewage to filter through in the necessary quantities.

With the present flow of sewage, which is considerably greater than at the time the plant was first used, the plant is not large enough to obtain satisfactory purification; although by more faithful and expert management, better results could be obtained, even with the present area of filtering material. It is the intention of the city to connect the Glenville sewers with the main interceptor when the latter is completed and thus do away with the necessity for a plant at Glenville. It is not known definitely, however, when this will be possible. Existing conditions should surely be improved in the meantime.

Opposite the Glenville plant, on the southeasterly side of Dugaway

Brook, is a large egg-shaped sewer, approximately 3 feet by 4 feet in section. This is a combined sewer and is designed to drain a considerable area in the Glenville district. As yet, no permits for house connections have been granted for this sewer, although it is probable that a few houses have made connections illegally. At the time of inspection there was a considerable flow of water in this sewer, but no distinct signs of domestic sewage could be detected. It is the ultimate intention of the city to continue this sewer to the main interceptor, when the latter is completed, leaving a storm water overflow into Dugaway Brook.

Shaw Brook. This is a small and probably intermittent stream originating near the center of the village of East Cleveland and flowing in a northwesterly direction for a distance of about two miles. It discharges into the lake a short distance west of the easterly corporation line of Bratenahl. This stream receives drainage from several private residences located in East Cleveland, and there are several stables and privies along the bank which probably produce more or less pollution.

From all available information, however, it appears that by far the chief source of pollution of this stream is the East Cleveland sewage disposal plant. At this plant, the sewage from 5,000 or 6,000 people, living in the village of East Cleveland, is treated by means of a septic tank followed by continuous filtration through three sets of coke or slag filters; a current of air being forced through the coke in order to aid in purifying the sewage. The original plans for this plant were approved by the State Board of Health in 1898, at which time the number of persons using the sewers tributary to the plant was very much smaller than it now is. Three years later, owing to the increased amount of sewage from the village, the plant was doubled in size and a septic tank added. Several inspections in the past have shown that the plant is capable of doing good work when the amount of sewage to be treated is not too great. The recent inspection, however, showed that the degree of purification being effected in the sewage was decidedly unsatisfactory and that the effluent from the works possessed an offensive odor, indicating that it was distinctly putrescible.

It is claimed that at times the flow of sewage from the village is passed directly into Shaw Brook without any treatment. This was not being done at the time of the recent inspection, although the condition of the brook a few hundred feet below the outlet of the plant was similar to a condition which would be caused by the discharge of untreated municipal sewage into it. About two-thirds of the volume of flow of the brook, at the time of inspection, consisted of the effluent from the sewage works.

CONCLUSIONS.

The board of public service of the city of Cleveland, which board is now in charge of the Glenville sewage disposal plant, should be notified

that this plant has not been built in accordance with the original plans approved by the State Board of Health; that its present capacity is not great enough to purify the sewage which is being discharged at the plant; and that the effluent from the plant is creating very offensive conditions in and along Dugaway Brook below the point of discharge. The conditions at this place should be immediately improved by providing more faithful and intelligent operation of the plant, and the size of the plant should be increased, as soon as possible, so that it will be capable of satisfactorily doing the work required of it.

Also the attention of the Cleveland board of public service and the Cleveland board of health should be called to the fact that the westerly branch of Dugaway Brook, for two or three miles above the Glenville plant and especially through that district lying between Euclid Avenue and Superior Street, is badly polluted by private sewers, drains and privies, and also by reason of its use as a receptacle for garbage and other refuse. The board of public service should be urged to provide proper sewerage for this district, as well as for the district lying near the easterly branch of Dugaway Brook, between the Nickel Plate and Lake Shore railroads, as soon as practicable.

In addition the above mentioned boards should be notified that the condition of Spring Brook between the Glenville race track and the northerly city limits should be improved by enforcing the necessary sanitary regulations to prevent the placing of refuse in this brook and also by preventing the discharge of domestic sewage into it.

The board of trustees of public affairs of the village of East Cleveland should be notified that, from all available information, the sewage disposal plant of the village of East Cleveland is not capable of purifying, in a satisfactory manner, the large amount of sewage which is now being discharged thereat, and that inspection has shown that Shaw Brook below the outlet of this plant is being polluted by the discharge from the plant; also that the several houses which have private drains leading into the brook should be connected with the village sewers as soon as possible.

November 10, 1905, a copy of this report was sent to the board of public service of Cleveland; the board of trustees of public affairs of East Cleveland; the health officer of Cleveland and the village council of Bratenahl; and the attention of the proper authorities was called to the conclusions of the report and they were urged to take the necessary steps to remedy the conditions set forth in the report.

REPORT ON THE SANITARY CONDITIONS AT BUCYRUS WITH REFERENCE TO THE NECESSITY FOR SEWERAGE.

Mr. W. J. Schwenck, the city solicitor of Bucyrus, having on January 2, made application for an investigation of the sanitary conditions at that place with reference to the discharge of sewage into the Sandusky River, the engineer visited Bucyrus on January 5, 1905, and was shown about the city by a committee of city officials. The reason for the present interest in these sanitary matters is caused by suits which are being brought against the city by farmers living near the river below, on account of the pollution of the stream. The following report was made:

Bucyrus is the county seat of Crawford County and is located principally on the upper portion of the Sandusky River, but a small portion of the city drains into the Little Scioto River.

It is said that no sewers discharge into the latter stream, but that cellar drains located in a small part of the south portion of Bucyrus drain into it.

The pollution of the Sandusky River at Bucyrus has been well known and acknowledged for many years. In 1895 the secretary of the State Board of Health made a sanitary investigation of the conditions and recommended that an intercepting sewer be built to carry the sewage below town to a proper site for purification works. In describing the conditions at that time he says: "Along the line of the river seven or eight sewers discharge their filth. The river on account of such pollution was in an exceedingly filthy condition, worse at some places than others. Just above the first bridge below the brewery the pollution was especially marked. The water was inky black, and the odor was foul and nauseating. Several dwelling houses are located near this point."

In 1897 proposed plans for additional sewerage for Bucyrus were disapproved by the State Board of Health as the stream was already so badly polluted.

In 1898, in connection with the general investigation of water supplies and watersheds of the state made by the former engineer of the Board, it was found that the city had some eight miles of sewers and that fully 90 per cent. of the population had access to them. There were at that time about 300 water-closets and 300 vaults connected with the sewers. To quote his report "starting with the sewer from the brewery, the river as far down as the cemetery is an open sewer, each tributary sewer adding more filth before the river has had time to recover from the last one. The small dam opposite the brewery is to back the water up so that it can be pumped to the adjacent ice pond. At this time, owing to the recent rains, this dam was allowing some water to escape, which helped to dilute the brewery sewage, but did not prevent the river from being covered with a thick, black scum and giving off a horrible stench. From

this point down the river is a succession of stagnant pools with their bottoms covered with a foot or more of thick, black mud that constantly gives off bubbles of gas. The water is black, greasy and covered with a thick black slime. It is claimed that the river is in good condition now and that it becomes much worse when there is no rain.

"The gas works dam is used to impound water for washing the gas and condensing purposes. The refuse of the gas plant is discharged above this dam. It consists of naphtha, grease and lamp black. The quantity is not large, but it discolors the river badly. Just below this dam the main sewer enters, and as the dam held all the water notwithstanding the recent rains, the river from this point was pure sewage. Night-soil is buried in shallow trenches near the river, below town, and every hard rain washes some of it into that stream. Kitchen garbage, hog-pens, geese, slaughter houses, all combine to make the river at this point one of the worst in the state."

The present conditions do not differ greatly from those above described. Since 1898, it is said, there have been about 25 connections with the sewers each year. This would make the total number of closets and vault connections 750, which are used by nearly one-half the entire population of the city. There are about eight miles of sewers, discharging at about ten different points, all built in an unsystematic way on the combined plan, so that large quantities of storm water are mixed with the sewage during wet weather.

Bucyrus is located within ten miles of the source of the Sandusky River, which has only a small watershed above this point. For this reason, and also on account of the existence of dams near the upper end of the city, the stream below is entirely dry for a large part of the time except for the sewage and filth which is discharged into it.

The gas works referred to above are still operating and at the time of inspection a large quantity of highly discolored oily and greasy waste was going into the river at the dam just above Sandusky Street. This waste unites with the sewage from the Sandusky Street outlet and causes a most offensive pollution of the stream, although this is some 2,000 feet above the largest outlet from the city.

Near the upper end of the city there is a brewery which discharges offensive matter into the river.

There is also a copper kettle works which is said to discharge more or less acid wastes into the sewers and thence to the river.

At at least two points the water of the river is diverted into so-called ice ponds. It is not definitely known whether the ice is used for domestic purposes, but it would be well to call the attention of the city officials to the fact that this ice is liable to pollution from the sewage of Bucyrus and Crestline and is not fit for human consumption.

The design of the present sewers together with the existence of manufacturing wastes which must be taken care of, will make the problem of

determining the best means of disposing of the sewage a complex matter and one which should be given thorough study by an expert engineer before any construction is done.

The village of Upper Sandusky, 24 miles below Bucyrus; the city of Tiffin, 58 miles below, and the city of Fremont, 75 miles below, all use the Sandusky River as a source of public water supply. It is therefore very important that when sewage purification works are built, they should be of such a design that the best possible effluent will be produced.

If the present system of sewers is to be used as a combined system in the future it will be necessary to have overflows into the creek at many points. It is doubtful whether it is desirable to allow this discharge of a mixture of storm water and sewage, especially as a rain which would greatly increase the flow of sewage and necessitate the discharge of a large portion of it into the river, would not necessarily be great enough to increase the flow of the stream at the same time. Hence large quantities of foul matter, containing the flushings from the sewers, would be deposited in the practically dry bed of the river. If an interceptor is built to receive the flow of the present sewers it will be necessary, on account of the topography of the city, to pump the sewage to purification works.

CONCLUSIONS.

Sewage purification works, for the disposal of the city's sewage, should be constructed as soon as possible.

It is especially important, on account of the use of the Sandusky River below Bucyrus as a source of water supply, that these works be designed and operated in such a manner that the sewage will be purified as thoroughly as possible.

A competent engineer, well informed and experienced in matters pertaining to sewerage and sewage disposal, should be retained at once to make preliminary surveys, estimates and investigations.

This engineer should determine:

1st. The cost of building an interceptor to receive the dry weather flow only, of the present sewers, together with the cost of pumping this dry weather flow to the proper site for purification works and the cost of such works.

2d. The cost of a new sanitary system of small pipe sewers for domestic sewage only, to discharge by gravity at purification works, together with the cost of these works. In this case the present combined sewers would be used for storm water only.

3d. The cost of a new sanitary system of small pipe sewers to discharge at purification works by pumping, together with the cost of pumping and purification works. In this case the present combined sewers would be used for storm water only.

4th. The best method of disposing of the various manufacturing

wastes and the possible harm to the efficiency of the sewage purification works if mixed with the city sewage.

5th. The flow of all present main sewers together with the chemical composition of the sewage.

A copy of this report was sent to the city solicitor, Mr. W. J. Schwenck, January 21, 1905, and his attention called to the bad conditions shown by the report and the importance of the city's installing a proper sewerage system at the earliest time possible. He was also advised that when these points had been thoroughly determined the State Board of Health should be notified and preliminary plans for the solution of the city's sewerage problem be submitted to the Board for approval.

REPORT OF AN INVESTIGATION OF THE PUBLIC WATER SUPPLY AT CARROLLTON.

November 15, 1905, Dr. A. H. Hise, the health officer of Carrollton, telephoned to the office of the State Board of Health stating that an objectionable sediment had appeared in the public water supply within three or four weeks, and requesting an investigation by the Board. Samples of the water collected by him were soon after analyzed in the laboratory. One of these samples, collected in a bacterial bottle and subjected to a bacterial examination only, showed a safe water. The other sample was subjected to a chemical analysis only, and the results showed that it contained a large amount of organic matter, which in view of the past good character of the water, called for further investigation. The chemical and the bacteriological samples were not collected at the same place, nor on the same day, though both were said to represent the public supply. December 6, 1905, the engineer of the Board visited Carrollton and in company with the health officer and other officials inspected the waterworks and collected further samples. The following report was made:

Carrollton is a village of about 2,000 population, located in Carroll County upon the upper end of the watershed of the Tuscarawas River. The waterworks were established in 1895 and now supply 90 per cent. of the entire population with water. The water is raised from the wells to a pump well, from which it is pumped to a distributing standpipe. The average daily consumption for 1904 was 110,000 gallons, a considerable portion of which was used by factories. The waterworks and wells are located in the valley of a small intermittent stream over a mile north of the center of the village and some 1,500 feet distant from the edge of the built-up portion. There are only two houses within 500 feet, the nearest being some 300 feet west.

The geological formation pierced by the wells is 15 to 20 feet of shale and clay, under which is sandstone varying in character, the harder stone

being near the surface. The sandstone contains layers or pockets of fine clay, soft shale and limestone.

Originally five 8-inch wells were sunk, the depths ranging from 75 to 100 feet. Two of these wells are now exhausted so that the supply is obtained entirely from the remaining three, designated as No. 1, No. 2 and No. 3. Well No. 1 is 98 feet deep. Near the bottom of this well, as evidenced by the material clinging to the casing when the latter was recently removed, is a strata or pocket of shale. Well No. 2 is 85 feet deep, and well No. 3 is 76 feet deep. All the wells are cased nearly to the bottom.

Originally the wells were pumped directly through the suction of the pump. Some three years ago, however, as the level in the water in the wells had dropped several feet below what it was originally, the air lift system was installed so that the water is now forced to the surface by compressed air. It has been observed that pumping one well lowers the level of the water in other wells about 50 feet distant. This would indicate that the wells are not placed far enough apart to obtain the greatest efficiency.

The quality of the water had always been satisfactory until about the middle of October, 1905, when, after a hard continuous draft on the wells with the compressed air for a period of some six months, during which the weather was comparatively dry, the water in wells No. 1 and No. 2 began to contain an objectionable sediment consisting of clay material and iron. The location and surroundings of the wells, their construction and also the material through which they are sunk, make it very improbable that they could be affected by sewage or polluting substances from the surface of the ground.

The samples collected at the time of inspection from wells No. 1 and No. 2 contained less suspended and organic matter than one of the samples, said to represent the public supply, collected by the health officer on November 16, 1905. The water from the wells No. 1 and No. 2 according to the last analysis, is safe for a public supply, though objectionable by reason of the sediment contained therein. The analysis of well No. 3 indicates a clear, safe and satisfactory water. (For analyses of this water see laboratory report on water supplies).

In way of explanation of the large amount of suspended and organic matter contained in one of the samples collected by the health officer on November 16, it is possible that this objectionable matter came from one of the pockets or layers of clay and shale which occur in the sandstone in which the wells are sunk. As the wells were pumped at a rate practically as high as they could stand, for several months, it may be that such a pocket of clay or shale was disturbed and sediment entered the water. The analysis of a sample of the shale from the bottom of well No. 1, after this material has been thoroughly washed, showed much less organic matter than would account for that in the sample of November 16th. The sample

of shale examined, however, was not representative of the condition of the material as it existed originally in the ground. If the sample of water was collected from a hydrant which had not been used for some time it is possible that the accumulation of sediment in the mains may have been responsible for the organic matter present.

CONCLUSIONS.

Although the results of the investigation indicate that the Carrollton water supply does not at present contain disease producing qualities, yet the physical condition of the water from wells No. 1 and No. 2 makes it unfit for use as a public supply. In order to supply enough water all the three wells must be used.

It is important, therefore, that the village at once take steps toward producing an increased and satisfactory water supply. To this end it would be desirable to secure a considerable area of land adjacent to the present waterworks and sink wells at sufficient distance from each other so that pumping from one will not affect the level of the water in the remaining wells.

A copy of this report was sent to the health officer of Carrollton, December 20, 1905, and it was suggested that a sufficient number of wells be put down, so that they would not have to be forced to the maximum capacity, and thus bring about a recurrence of the trouble from which they had been suffering. Attention was also called to the necessity of securing the approval of the State Board of Health of a new source of supply.

REPORT OF AN INVESTIGATION INTO THE ALLEGED IMPROPER USE OF A STORM SEWER IN CLAY STREET, CHILLICOTHE.

On October 6, 1905, a communication was received from Mr. J. L. Cunningham and thirty-six others, residents and property owners in the vicinity of Clay and Seventh streets, Chillicothe, calling attention of the State Board of Health to the use of a storm water sewer in Clay Street for domestic sewage, and protesting against the use of this sewer for such purposes. The engineer visited Chillicothe on November 9, 1905, and the following report was made:

In October, 1903, the State Board of Health approved plans for domestic sewerage for a certain district in Chillicothe, located in the southerly part of the village in the vicinity of Hickory Street upon a condition "provided the outlet be carried direct to Paint Creek and that sewage purification works be introduced whenever, in the opinion of the State Board of Health, this should become necessary."

These plans were carried out as approved, and in addition a 24-inch storm sewer has been built to drain the district, also in the southerly part of the city, in the vicinity of Clay, Seventh, Maple and Eighth streets. This sewer connects at the corner of Eighth and Hickory streets, with another 24-inch sewer, in the latter street, which is being used as the temporary outfall sewer for the sanitary system, built in accordance with the condition quoted above. This Hickory Street sewer discharges into Paint Creek. At the time of inspection the creek was high and no nuisance whatever was being created by the sewage at this point.

Into the manhole at the upper end of the 24-inch storm sewer in Clay Street there has been connected a 6-inch domestic sewer which receives, or is to receive, the domestic sewage from two or three houses located on Clay Street. A manhole at the upper end of the domestic sewer has been constructed with the idea of installing a flush tank therein; but this manhole, it is claimed, has proved to be too small for the purpose.

Domestic sewage is, therefore, to be discharged into the manhole in Clay Street, at the head of the storm sewer, and unless this sewer is properly flushed from this manhole down, offensive odors will be created and will escape through the perforated manhole cover, and also through the catch basin, in case the traps in the latter become dry. Danger of offensive odors being created by these conditions could probably be prevented by installing a proper automatic flush tank at the head of the storm sewer and by keeping the catch basin traps filled with water.

The practice, however, of using this storm water sewer as a combined sewer is distinctly undesirable, especially as the sewage from this district is likely to require purification in the future. On the other hand, it is claimed by the city engineer that the topography of the district through which this 24-inch storm water sewer passes is such that it would be impossible to construct a separate domestic sewer within and connect it with the Hickory Street sewer by gravity; and that when the time arrives for sewage purification that a domestic sewer could then be laid in this district and made to discharge at purification works, where pumping would be necessary not only for the sewage from this district, but for other sewage. It is claimed that this procedure would give, ultimately, greater economy.

November 13, 1905, a letter was addressed to the board of public service of Chillicothe calling their attention to the matter and they were advised that from the report of the engineer it would seem that the objections raised by these property owners were well founded. They were further advised that the Board considered it very undesirable that this domestic sewer should be connected with a storm sewer, and that the Board would urge that this sewer be either disconnected and extended to some proper sanitary sewer, or that a large flush tank be installed and operated at the head of the storm sewer in Clay Street opposite the end of Maple Avenue, to keep this sewer from becoming a source of offensive odors.

REPORT OF AN INVESTIGATION OF THE WATER SUPPLY OF DAYTON WITH REFERENCE TO ITS POS- SIBLE POLLUTION.

The health officer of Dayton, Dr. C. W. King, requested the State Board of Health to make an investigation into the possible danger of the pollution of the water supply of that city from the Wuchet Fertilizer Company's plant and from the city's garbage reduction plant.

The engineer of the Board visited Dayton on October 12, 1905, and, in company with a representative of the local board of health, made an investigation. He reported as follows:

It appears that while there are drains leading to the river from both of the above mentioned plants, that the use of these drains is probably restricted to the discharge of unobjectionable condenser water. There seems to be no opportunity for discharging refuse through these drains unless such refuse is taken up and shoveled or otherwise thrown into them. This would necessitate more work than would be necessary in disposing of the refuse through the regular machinery provided for that purpose.

It is quite probable therefore that all offensive matter with the exception of a small amount, spilled from the wagons, is placed, upon arriving at either of the plants, into the large digesters or cookers and subjected to a high degree of heat which would probably kill any disease germs contained therein.

An important point to be considered in connection with possible pollution to the water supply from these plants, is the fact that the wells of the Dayton waterworks undoubtedly draw a very large proportion, if not all, of their water from the ground underneath the city and that any pollution in the river water might have no effect upon the well water. We cannot, however, speak with absolute certainty on this point at this time. We will, if you desire it, and with your assistance, arrange to make as thorough an investigation as possible into the source and quality of the Dayton water supply, by means of extensive observations upon the level of the ground water at various points and by studying the chemical and bacteriological contents of the city water supply as compared with the water of the river and with the private wells in the neighborhood. Such an investigation would also probably show what effect, if any, the building up of the city in the vicinity of the waterworks has had upon the quality of the water.

The results of the engineer's investigation were sent to the health officer of Dayton in a letter under date of October 17, 1905.

REPORT OF A NUISANCE OCCASIONED BY IMPROPER DISCHARGE OF SEWAGE AT HIRAM.

October 3, 1905, Mr. George M. Colton, clerk of the board of health of Hiram, requested advice of the Board relative to a nuisance occasioned by the discharge of sewage from several houses into a small stream in the northwesterly part of the village. The engineer visited Hiram, October 21, 1905, and the following report was made:

Located in the northwesterly part of the village of Hiram, on North Campus Street, are five houses which are connected with a 6-inch tile drain. All of the houses discharge sink drainage and roof water into this drain, and in addition one of them discharges, while another may discharge, water-closet wastes into the same drain.

The drain referred to extends along the rear of the five houses for a distance of 200 feet, then passes in a southerly direction through private grounds and discharges into a small intermittent water course or small ravine at a point not more than 150 feet away from the residence of C. F. Davis, the owner of the property on both sides of the stream. The discharge of sewage in this manner although not very great in amount, is decidedly objectionable to the occupants of the Davis house and is decidedly a nuisance. The local board of health has considered it a nuisance, but the persons using the drain have refused to remedy the conditions and the local board desires the advice of the State Board of Health towards exercising its legal powers.

Above the location of the sewer outlet mentioned a small water course receives the sink drainage from two or three houses, the drainage from a livery stable and barnyard, and possibly some pollution from a privy located nearly over the stream. Besides abating the nuisance caused by the sewer outlet above described, it is also important that the drainage from these houses and the stable be so disposed of that it will not pollute the stream.

Three remedies have been proposed by the local board as possible means for abating the nuisance complained of. These remedies are as follows:

1st. To extend the sewer to a point about 400 feet farther down stream from the present point of discharge (and the same distance from the nearest house) and there build a cesspool with an overflow into the stream or rather into the stream bed as there is no water flowing most of the time.

2d. To construct a cesspool in the present line of the sewer and discharge the overflow from this cesspool at the same point where the sewage is now being discharged.

3d. To construct a cesspool upon each property connected with the sewers; each cesspool being intended to remove the solid matter from the water-closet wastes.

None of the schemes suggested by the local board provide for the purification of the sewage or foul liquid which would overflow from the cesspool and which if discharged into the dry stream bed, as at present, would undoubtedly cause a nuisance. Either cesspools without overflows or some method of sewage purification should be adopted.

CONCLUSIONS.

1st. The present method of disposing of the sewage and other wastes from houses on North Campus Street by discharging them through a tile drain into a small intermittent stream, a tributary of Silver Creek, within 150 feet of the Davis residence, is a decided nuisance and steps towards correcting these conditions should be made at once.

2d. The suggested plan of building one or more cesspools, the overflow from which would discharge without further purification into the stream, either at the present outlet or a point farther down, would not afford a satisfactory means of correcting the present evil.

3d. The sewage and sink drainage from the houses in the northwestern part of the village on North Campus Street which are now discharging, either through individual drains or through a common drain, into a small tributary of Silver Creek, which passes through that street, should be conveyed through proper sewers to a point 300 or 400 feet below any house in the village and there purified by an efficient sewage disposal plant, plans for which should be approved by the State Board of Health; or proper cesspools without overflows, should be constructed for each house, provided that such cesspools would not contaminate any wells used for domestic purposes.

This report, which was approved by the State Board of Health, at a meeting held October 25, 1905, was sent to Mr. George Colton, clerk of the board of health of Hiram, October 27, 1905.

REPORT UPON THE NECESSITY FOR A SEWAGE PURIFICATION PLANT FOR THE HOME OF THE OHIO SOLDIERS, SAILORS, MARINES, THEIR WIVES, MOTHERS, WIDOWS AND ARMY NURSES, LOCATED AT MADISON.

On October 5, 1905, the superintendent, Mr. Walton Weber, made application to the State Board of Health for advice relative to the disposal of the sewage of the Home of the Ohio Soldiers, Sailors, Marines, their Wives, Mothers, Widows and Army Nurses, and also for an estimate of the cost of installing a sewage purification plant to provide for the present as well as for future needs. This advice was asked for in order to assist

the board of managers in framing a request to the next Legislature for an appropriation to pay for such a plant. On October 21, 1905, the engineer of the Board met the board of managers at the institution and made an examination of conditions. The following report was made:

PRESENT CONDITIONS.

The Home of the Ohio Soldiers, Sailors, Marines, their Wives, Mothers, Widows and Army Nurses is located in Madison, about one mile north of the Lake Shore Railroad station and 3 1-2 miles south of Lake Erie. The Home is now strictly a state institution, although it was formerly supported by the Woman's Relief Corps.

There are at present from forty to fifty persons living in the institution, about thirty of whom live in the main building and the remainder in a smaller building nearby. The board of managers is contemplating building one or two more cottages in the immediate vicinity of the present buildings.

The sewage from the main building, in which there are four water-closets, is discharged through a tile pipe into a circular brick cesspool about 12 feet in diameter, located 250 feet north of the main building and covered with a rough wooden platform. There is an outlet or overflow from the cesspool near the top, from which the sewage flows to a small ditch several hundred feet farther north. The cesspool is said to be 6 or 8 feet deep. At the time of inspection it was full of solid matter up to the overflow pipe. The bottom portion of the contents of the cesspool appeared to be sand and earth, washed in by rains from the ground surrounding it, while the top one or two feet was thick sewage sludge which created a decidedly offensive odor in the vicinity, although the day was cold. This has been the cause of complaint on the part of the occupants of the Home as well as others living in the neighborhood within a fourth of a mile.

The overflow from the cesspool discharges into a small ditch, as above mentioned, located 500 feet farther north, near the northerly limits of the property of the Home. This ditch has a flat grade and the foul liquid fills it above as well as below the sewer outlet; thus forming a pool of foul offensive sewage several hundred feet long, located mostly upon land belonging to the institution, but also upon the property immediately east. From the pool the sewage flows down the ditch into a tile and thence into a small water course leading to Lake Erie. The discharge of the liquid overflowing from the cesspool, as well as the cesspool itself, is a decided nuisance and a just cause of complaint on the part of those living near by.

The smaller building of the institution has no water-closet, but is provided with a dry closet, the contents of which are hauled out and placed upon the land every week or two. The slops from this building

are thrown out upon the ground and a small amount of sink drainage is discharged into the garden.

NECESSITY FOR A SEWAGE PURIFICATION PLANT.

The methods now employed for disposing of the sewage from the institution are decidedly inefficient and detrimental to the health of all persons living at the Home and vicinity. In order to correct these conditions a sewage purification plant, consisting of a properly constructed septic or settling tank, together with sand filters, should be installed as soon as possible.

ESTIMATE OF COST.

It would be impossible to make a definite estimate of the cost of a sewage purification plant for the institution without an accurate plat of the ground and definite information regarding the cost of material in this vicinity. Nevertheless, a closely approximate estimate may be made by considering in a general way the local conditions covering the case, and by comparing these conditions with those relating to similar plants in other localities.

The following is an estimate of cost of a sewage purification plant, to purify the sewage of the Home of the Ohio Soldiers, Sailors, Marines, their Wives, Mothers, Widows and Army Nurses, at the present time as well as when the population has reached 200 people, this being the number which the board of managers estimates will live at the Home after the proposed new buildings have been constructed:

Vitrified sewer pipe and tile pipe, in place.....	\$250 00
Septic tank	300 00
Dosing tank and automatic discharging apparatus.....	150 00
Sand and gravel (520 yards sand, 80 yards gravel).....	600 00
Excavation and walls for filters.....	200 00
Plans and engineering.....	300 00
Total.....	<u>\$1,800 00</u>

This report, which was approved by the State Board of Health at its meeting held October 25, 1905, was sent to Mr. Walton Weber, superintendent of the Home, and the Board offered to render its assistance in any way possible.

REPORT ON THE POLLUTION OF A DITCH AT NEVADA.

October 12, 1905, Dr. H. E. Dwire, health officer of Nevada, requested the assistance and advice of the State Board of Health in connection with improving certain bad sanitary conditions caused by the pollution of a ditch. The engineer visited Nevada on November 17, and the following report was made:

Nevada is a village of less than one thousand population, located in east-central part of Wyandot County and is upon the watershed of the Sandusky River, although no stream of any considerable size flows in the immediate vicinity.

The village is divided approximately into halves by the Fort Wayne division of the Pennsylvania Railroad, which passes through the center of the town in an easterly and westerly direction. Parallel to the railroad and 300 or 400 feet south of it an intermittent stream or open ditch extends through the entire occupied portion of the corporation. This small water course originates about a mile southeast of town but has no flow whatever during the larger portion of the time.

Located adjacent to the banks of this ditch in its course through the village are six or eight privies, the contents of which are likely to be washed, at times of heavy rain, into the ditch to a greater or less extent. It is claimed that there are no pipes connecting these privy vaults direct to the stream, however.

About half way between Ayer Street and Main Street is the outlet of a 15 or 18-inch tile. This tile receives the overflow from two cesspools belonging to the residences of Mr. J. A. Williams and Dr. S. E. Bratz, situated near the corner of Main and Center streets, a few hundred feet north of the railroad. This tile also receives the drainage from a livery stable and a veterinary hospital. It passes under the railroad, at which point it receives the surface drainage from a considerable area of railroad property. For a distance of 200 feet immediately south of the railroad, the tile pipe is replaced by a small open trench.

In the southeasterly portion of the village at a point within a few hundred feet of several houses, the town ditch receives the wastes from a creamery. When the flow of water in the ditch is very small or when there is no flow, as was the case at the time of inspection, these creamery wastes putrefy in the ditch and create a decided nuisance. In addition, hogs are allowed to wallow in the ditch near this point and this further adds to the nuisance.

CONCLUSIONS.

In order to protect the intermittent stream or ditch which flows in a westerly direction through the southern portion of the village of Nevada,

the following steps should be taken.

1st. All privies located near the ditch should be tightly cemented so that all possibility of their contents ever reaching the ditch will be avoided.

2d. The discharge of liquid or other matter from any cesspool, into the ditch, should be strictly prohibited.

3d. The drainage from any stables or barn other than that originating from the washing of carriages and overflow from the watering troughs, should not be allowed to be discharged into the ditch.

4th. The wastes from the creamery in the southwesterly part of town should be purified before allowing them to drain into the ditch, or should be disposed of in some other manner.

A copy of this report was sent to the health officer, December 1, 1905, and he was informed that he had authority to prohibit the discharge of the overflow from cesspools or other filthy substances into this ditch and should do so.

The assistance of the Board was also offered in the endeavor to have the creamery purify its waste material.

REPORT ON A NUISANCE CAUSED BY THE OHIO CANAL FEEDER AT NEWARK.

On June 19, 1905, the health officer of Newark, Dr. Henry Day, was instructed by the board of public service (which is the acting board of health) to apply to the State Board of Health for aid in securing the abatement of a nuisance caused by the pollution of the feeder of the Ohio Canal. The engineer visited that place on July 3, 1905, and the following report was made:

The Ohio Canal passes through the central part of the city of Newark in an easterly and westerly direction. This canal is fed entirely by the water from Buckeye Lake but there is an abandoned feeder which was designed to take water from the north fork of the Licking River at a point about one mile north of the corporation and discharge it into the Ohio Canal near the central part of the city.

Under present conditions this feeder, from a point near the northerly corporation line southerly to the upper B. and O. railroad bridge, is entirely cut off and no water can enter this portion except a small amount of surface water.

From the upper B. and O. bridge southerly to the Ohio Canal, all water in the feeder under present conditions is back-water from the canal; but as the canal water level is generally below normal, certain portions of the feeder are drained during a portion of the time, and the water surface is subject to fluctuations.

This portion of the feeder, and especially the section, about 2,000 feet long, between the upper B. and O. railroad bed and Church Street, is used as a receptacle for all kinds of rubbish, garbage and dead animals so that when the water is drawn off the odors are very offensive and are decidedly objectionable to the occupants of about one hundred houses located within 500 feet of the feeder. In addition there is a rank growth of weeds in the bed of the feeder which by decaying, when the water is drawn off, further increases the offensiveness.

Below Church Street the water of the feeder is used for steam purposes by the city electric light works and one or two manufacturing concerns, as the canal water is softer than the public water supply of Newark. The state board of public works receives a revenue from these water users and for this reason the city authorities of Newark do not request the abandonment of that portion of the feeder from which water is taken.

Under Church Street is a pipe culvert through which the water passes back and forth, according to the water level in the Ohio Canal; thus causing the fluctuation in the feeder above Church Street previously mentioned.

The city authorities desire to be allowed to stop up this culvert so that no water can enter the feeder above Church Street; or to be allowed to fill in this portion of the feeder. It is claimed that if the feeder can be kept dry, it will be comparatively a simple matter to prevent the throwing of refuse matter into it; but that, under present conditions, it is practically impossible to keep track of what is thrown into the feeder when the water is high.

The B. and O. railroad is at present using a certain section of the feeder, a few hundred feet long and adjacent to its property, as a dump for cinders, old sleepers, and other refuse; and this section is being gradually filled up.

CONCLUSIONS.

1st. The nuisance complained of is caused by the intermittent draining of the canal feeder and the filling with back water from the Ohio Canal, by placing rubbish, garbage, dead animals and other refuse in the feeder and by the growth of weeds and water plants which are exposed and decay when the water is drawn off from the feeder.

2d. If a portion of the feeder between the upper B. and O. railroad bridge and Church Street, covering a distance of about 2,000 feet, were filled in and the feeder abandoned, the nuisance would be entirely abated.

3d. If this portion of the feeder were drained and kept dry by stopping up the culvert at Church Street, then, with reasonable care on the part of the local health department, the nuisance would be abated.

4th. It is possible that, by very close and continued inspection on the part of the local health department, the placing of refuse in the feeder could, to a certain extent, be prevented even with the feeder in its present condition and the present nuisance could be lessened; but with the stagnant or fluctuating water there would always be cause for complaint on account of the exposed growths in the bottom of the feeder and also on account of such conditions being favorable to the breeding of mosquitoes.

A copy of this report was sent to Dr. Henry Day, of Newark, July 10, 1905, and a conference was held with Mr. Perkins, chief engineer for the State Board of Public Works, who promised to bring the matter before that Board.

REPORT OF AN INVESTIGATION OF AN ALLEGED NUISANCE AT NEW PHILADELPHIA.

Complaint was made to the State Board of Health in reference to the prevalence of disagreeable odors and also in reference to some detrimental effect that was being produced upon the paint on houses and other buildings at New Philadelphia. The chemist visited that city on November 4, 1905, to ascertain, if possible, the cause. The following report was made:

In company with various citizens an inspection was made of many of the houses where the paint showed some disturbing influence. This effect was noticeable on a greater proportion of the houses in the northern and eastern portions of the city and in the neighborhood of the Pennsylvania depot. It was found that the outer layer of the paint in many places had turned dark—a blue gray tint, but there had been no penetration into the depth of the paint. It was said that this change had occurred during the last few months and it had been especially marked on certain foggy nights, the effect being very noticeable the next morning. In the presence of several of the citizens, a like change was produced by generating hydrogen sulphide and throwing it upon a painted wall that had been moistened with water. The presence of moisture aids the chemical action.

As is well known, the basis of many paints is a basic lead carbonate and when hydrogen sulphide comes in contact with it under moist conditions the sulphur unites with the lead giving lead sulphide (PbS). As lead sulphide is almost black the change in color naturally appears. As a further demonstration the PbS was oxidized to $PbSO_4$ (lead sulphate) by means of an oxidizing agent, viz., hydrogen peroxide. This caused the disappearance of the dark color, since lead sulphate is white.

Having established the cause of the trouble, it was necessary to determine the source. Incidentally it may be said that several agencies suspected by local residents as being possibly responsible for the trouble were eliminated. Among these was the enameling factory.

Attention was next directed to a gob-pile, a waste pile near the mouth of a mine which represents the accumulated refuse of the mine. The pile contains some coal in more or less finely divided condition, the waste from the sulphur bearing seam, and consequently pyrites, iron sulphide, and sulphur.

The mining of this locality is done from coal seam No. 6, and this is especially rich in sulphur. The source of the trouble was located in the burning gob-piles connected with the coal mines of that vicinity. For lack of time, only two of the mines were visited, viz., Reeves Mine No. 2 and Honey Run Mine. These mines are situated up the valley some three miles distant from the city and to the northward. The effect upon the paint was very noticeable on buildings along this valley and very markedly so on the buildings near the coal mines. On reaching the mines sulphide was found issuing in considerable quantities from the crevices in the gob-piles and its presence was demonstrated by chemical tests. In addition a painted board was moistened with water and held for a few moments in the escaping gas and smoke with the production of the characteristic color change which was later removed in the chemical manner previously noted. There was a striking illustration at Reeves Mine No. 2, where two houses had been painted some four or six weeks prior to the investigation. One had been painted a dark red color, using venetian red without lead, and of course no effect from the gas was noticeable on this house. The adjoining house was painted at the same time with venetian red to which lead had been added in order to produce a lighter color, and it gave marked evidence of the formation of the lead sulphide.

On the day of the investigation no odor of hydrogen sulphide was noticeable at New Philadelphia, but it was a clear day and the atmospheric conditions were such that the gas and smoke rose readily from the gob-piles. On the other hand, at times of fog or rain, when the barometric pressure was low, this heavy gas would naturally have a tendency to remain closer to the ground, and has evidently been carried down the valley to the city. Local residents had noticed from the vantage point of the hills that at times a heavy cloud could be seen sweeping down the valley from the mines toward the city.

The odor at the gob-piles, as well as the odor produced by chemical manipulation at the time of the experimental tests on the painted houses, was pronounced by the by-standers as identical with the odor that had been noticed on those particular nights and early mornings when the trouble was most serious. The testimonies concerning the identity of these odors were given spontaneously and without solicitation.

At the Pennsylvania depot there is an ash pit where it is customary

to pull the ashes from the local engines. These engines burn this coal rich in sulphur and after the ashes, and particularly burnt coal, are pulled they are wet with water in order to facilitate handling as they are hauled away. At such a time it is said that a similar odor is produced, and doubtless there is a production of hydrogen sulphide with its subsequent action on the lead paint in that vicinity.

Since sulphuretted hydrogen is a poisonous gas its introduction into the lungs of a human being is a disastrous procedure and even when inhaled in small quantities leads to conditions of ill health. The presence of this gas in the atmosphere to the extent evidenced by such marked chemical action on paint can only be considered as deleterious to health. Again, it is evident to all who are familiar with the odor of hydrogen sulphide that the presence of this gas to so marked degree in an inhabited locality constitutes a nuisance. The presence of this gas in the atmosphere to such a degree, therefore, constitutes a nuisance and, furthermore, one that is directly injurious to health.

MEASURES FOR RELIEF.

The measures for relief are of two kinds: A., *preventive* for the future, and B., *remedial* for the present trouble.

A. The preventive measure consists in a more careful separation of the sulphur deposit in the first place, and secondly in not allowing the gob-piles to accumulate to such an extent, and especially to such height. Experience in the handling of large amounts of coal has taught that piles over ten or fifteen feet high, containing fine coal or slack, and without free access of air, are apt to lead to spontaneous combustion. The gob-pile material should be well sorted and then kept well scattered.

B. In reference to remedial measures for the gob-piles now causing the nuisance, it has been suggested that the piles be covered with dirt. This might succeed in some cases if most extensively and carefully done, but does not seem advisable here. Flooding of the gob-pile with water, even if practicable at these mines, would only furnish temporary relief, as the trouble would again break out, and a partial wetting only causes the production of more gas as noticed after rains. The most practical solution seems to be the tearing to pieces of these gob-piles and, as they are not large, this would not involve a great deal of labor.

In reference to the portion of the trouble arising from the railroad at the Pennsylvania depot, the treatment of course is preventive and will doubtless receive attention as soon as the proper officials have had their attention called to the case.

A copy of this report was furnished to the local authorities.

REPORT ON THE CONDITION OF AN ICE POND AT NORTH LEWISBURG.

Mr. V. B. Guy, secretary of the board of health of North Lewisburg, on June 16, 1905, requested the assistance of the State Board of Health in condemning a mill or ice pond in the residence district of the village. It was claimed that the pond became a source of foul odors at certain times and constituted a nuisance. In addition, the ice from the pond was being sold in the village. The engineer of the Board visited North Lewisburg on June 28, 1905, and the following report was made:

North Lewisburg is a village of about 1,000 population, situated in the northeast corner of Champaign County upon Spain Creek, a small tributary of Big Darby Creek, which in turn finds its way to the Scioto River.

Across Spain Creek, just above, or south, of the village is a stone dam, built for the purpose of impounding the creek water and diverting a portion of it through a race-way about a half mile long, into the so-called Beltz Mill Pond. The dam was practically washed out about a month ago so that at the time of inspection no water was being diverted, but it is proposed to rebuild the dam in the near future and divert the water as before.

It is stated by the owner of the ice pond and admitted by the local board of health, that there are no houses on the Spain Creek watershed within 300 feet of the stream and little danger of pollution above North Lewisburg. The flow of this stream is very small in dry weather.

Entering the race-way at a point about 1,500 feet above the mill pond is a small stream two or three miles long, known as Waggy Brook. Near the lower part of this brook, where it crosses Cemetery Street are four houses situated within a few feet of the stream; which with their barnyards and privies afford opportunities for dangerous pollution. It is said that there are also two more houses further upstream, which may drain into it.

At the point where Waggy Brook enters the race-way is a spill-way provided with flash boards so that in time of flood a certain portion of the flow of Waggy Brook may be diverted directly into Spain Creek without passing through Mill Pond. There is, however, no doubt that at certain times the waters of Waggy Brook, containing more or less pollution, may enter the Beltz Mill Pond and be retained in the form of ice.

The Beltz Mill Pond itself, is located near the center of the village and about 100 feet north of Sycamore Street. It has not been used for power purposes for several years. There is a large number of houses within a short distance. These houses, with possibly one or two exceptions, are, however, below the level of the pond and hence the drainage from them cannot pollute it.

The water in the pond is controlled by means of flash boards. The pond can be almost entirely drained or the depth of water made 2 or 3 feet. A certain amount of pond water is used in summer for street sprinkling. Just before the ice season, water is held in the pond at an average depth of about 2 feet, decreasing to zero at the edges. It is said that the ice is cut when about 8 inches thick, thus leaving about a foot of water below it.

At the time of inspection, the water was nearly out of the pond and its bottom, as well as the bottom of the race-way above it, contained a thick layer of mud or soil in which flourished large quantities of weeds and various types of water plants. The owner of the pond claims that before the pond is flooded for ice cutting purposes that these weeds are cut down and removed. A member of the local board of health contradicted this statement, at least so far as it applies to the last season.

A sample of ice from the ice house was inspected and apparently contained no suspended matter, although some of the citizens claimed that the ice frequently contains grass and dirt. The local board of health has forbidden the use of this ice for anything but refrigerating purposes but, as a matter of fact, it is said that no inspection is made to find out whether or not this order of the local board is being carried out.

The greatest cause of complaint, however, against the mill pond is the odor which is said to arise from it during the late summer and autumn, when the weeds and other growths die and decay. It is claimed that during certain seasons disagreeable odors are noticeable by residents living a thousand or more feet away from the pond and that these odors are decidedly offensive to those living nearest and also to those passing along Sycamore Street.

At the time of inspection, however, the weeds and growths were in a healthful condition owing, probably, to the large amount of rainfall within the last month and no offensive odors were noticed even at the pond itself. Many citizens, however, spoke very definitely and strongly as to the existence of an offensive odor at times.

CONCLUSIONS.

1st. The water of the Beltz Mill Pond is liable to pollution from several houses located near Waggy Brook, one of the feeders of the pond, and for this reason ice cut from said pond under present conditions, should not be used in any case where it might come in contact with food or drink.

2d. Mud and growths in the bottom of the pond and in the race-way above the pond, are undesirable for the production of good ice and in addition afford conditions which appear to be favorable for creating objectionable odors which would make said pond a nuisance to those living near it.

3d. By a thorough removal of the soil and growths from the bottom of the pond and the replacing of this soil with clean gravel, by excluding all muddy water from the pond by means of suitable gates, by cleaning the bottom of the pond frequently; and by permanently diverting the flow of Wagy Brook from the pond, by means of a channel passing under the race-way or otherwise, it is possible that the Beltz Mill Pond could be made to produce a satisfactory grade of ice and that the danger of a nuisance from the pond would be eliminated.

4th. If the pond is used as a source of domestic ice supply the local board of health should keep a continual watch upon the watershed in order to prevent any pollution reaching the pond.

A copy of this report was sent to Mr. V. B. Guy, secretary of the board of health, on July 7, 1905, and his attention was called to the fact that ice from this or any other source could not be sold in the village without a permit from the board of health. He was also advised that when the nuisance again made its appearance the board of health should investigate it, pass a resolution condemning it as a nuisance and serve an order on the owner to abate it by cleaning the pond, giving him a reasonable time to do so, and in case he failed to obey the order, to promptly cause his arrest and prosecute him for violating an order of the board of health.

REPORT ON THE WATER SUPPLY AND SEWERAGE OF BEACHLAND, A PORTION OF NOTTINGHAM.

The health officer of Nottingham, Dr. W. O. Jenks, on June 28, 1905, requested the Board to investigate the sanitary condition of Beachland with reference to the water supply and sewerage. This place was visited by the engineer on August 5, 1905, and the following report was made:

Beachland is a small private summer resort or settlement, located upon the shore of Lake Erie, within the corporate limits of Nottingham and about 8 miles east of the center of the city of Cleveland. This settlement covers an area of 300 by 1,500 feet, the shorter dimension being approximately parallel with the lake shore. There are some fifteen or twenty cottages occupied at present, while others are being built. These cottages are all provided with modern plumbing and are connected with a common waterworks and sewerage system.

Water Supply. The water supply for the community is drawn from the lake at a point nearly opposite the westerly boundary of the property. A brick lined well has been dug in the beach and from the bottom of this well a 4-inch iron pipe extends out into the lake for a distance of 175 feet, terminating in a large sewer pipe filled with crushed slag. From the brick well on the beach the water is raised by a pump, operated by a gas

engine, into a stand-pipe from which it is distributed to the cottages.

The beach in the vicinity of the waterworks intake is used to a considerable extent for bathing and 300 feet east of the intake is the outlet from the Beachland sewerage system which is described below. A large portion of the sewage of Cleveland is discharged into the lake at a point three or four miles west of Nottingham; while nine miles west the Cuyahoga River empties large quantities of filth into the lake.

A sample of the water was collected from the tap in one of the cottages and sent to the laboratory. The analysis of this sample shows that the water was at the time of collection affected to some degree by sewage pollution. (For analysis of this water, see laboratory report on water supplies).

Sewerage System. All cottages are connected with a 6-inch or 8-inch vitrified sewer leading to an underground tank (the construction of which could not be definitely ascertained) located near the edge of the bluff bordering the lake. It is said that this tank contains some kind of filtering material or purifying medium. The sewage appearing at the outlet of the tank, or so-called purification works, is however decidedly unpurified. It contains a large amount of offensive matter both in solution and in suspension. This sewage flows over the beach and into the lake near the westerly boundary of the property, only 300 feet east of the water supply intake. It appears to be creating more or less of a nuisance and gives off disagreeable odors.

The chemical analysis of a sample of the sewage flowing over the beach showed that little if any purification had been effected in it during its passage through the underground tank.

CONCLUSIONS.

First. The water supply of Beachland, though of satisfactory appearance, is subject to possible pollution from the bathers in the vicinity of the intake, from the discharge of sewage at a point 300 feet east of the intake and from the sewage of Cleveland.

Second. The discharge of the unpurified sewage into the lake, as under present conditions, affords a possible source of pollution to the Beachland water supply and also creates a nuisance upon the beach and endangers the health of persons bathing in the vicinity of the outlet.

Third. The water of the Beachland supply should be filtered in a proper manner through sand, either with or without the use of a coagulant, before delivering it to consumers.

Fourth. The sewage of Beachland should be purified by sand filtration before it is allowed to enter the lake.

A copy of the engineer's report, and also of the chemist's report upon his analysis of samples of water and sewage from Beachland were sent to Mr. M. H. Nason, the manager of Beachland, and attention was

called to the fact that plans for the water supply and sewerage system had never been submitted to or approved by the State Board of Health; that from the report it was clear that both the water supply system and the sewerage system of Beachland were not in accordance with good sanitation, and would not, as constructed, meet the approval of said Board.

The hope was expressed that they would have plans made for the purification of both the water supply and sewage, and submit the revised general plans, containing provision for these improvements, to the State Board of Health for action.

A copy of the report was also sent to Dr. W. O. Jenks, the health officer of Nottingham, September 2, 1905.

REPORT ON THE WATER SUPPLY OF PORTSMOUTH WITH REFERENCE TO THE NECESSITY FOR FILTRATION.

Mr. J. W. Smith, chairman of the city council committee on water and light, having requested an expression from the State Board of Health as to the necessity, desirability, and general methods for improving the Portsmouth water supply, the engineer visited that city on March 6, 1905, and the following report was made:

PRESENT CONDITIONS.

The Portsmouth waterworks were installed by the city in 1871. The intake is located nearly opposite the center of the corporation, although at the time of installation it was at the upper end of the populated district and above all local pollution. During the last few years, however, the city has spread rapidly in the easterly direction, or up stream, and there is now much pollution entering the river, principally from industrial plants, within a few miles of the intake. Sanitary sewers must soon be built and outlets will be desired into the river above the intake.

In April, 1904, the State Board of Health, acting upon the report of its engineer, expressed its opinion that the sewage from the Norfolk and Western Railroad shops was then a menace to the water supply. The pollution from these railroad shops has materially increased since last inspected.

A large amount of mud and silt in the river water, at times, causes much wear on the pumps and also serious clogging of the distribution pipes. At times, the intake pipe itself has been entirely filled up and the city water supply cut off.

The people are forced to depend largely upon cisterns filled with river water, when the latter is clear. Private wells are used to some extent also. There are a few sanitary sewers in the city and vaults and

cesspools are used extensively. The ground water is, consequently, seriously contaminated. It is practically impossible to obtain a safe water supply either from private or public sources under present conditions.

As would be expected from such conditions the typhoid fever death rate is very high and has been increasing constantly during the past ten years as shown by the following table:

TABLE I.

Annual death rate from typhoid fever in Portsmouth, Ohio.

Year.	Actual number of deaths.	Estimated population.	Rate per 100,000 living population.
1895	10	15,500	65
1896	11	16,000	69
1897	10	16,500	61
1898	9	17,000	53
1899	8	17,500	46
Average for five years.....	....	....	59
1900	11	18,000	61
1901	10	18,500	54
1902	13	19,000	69
1903	18	19,500	93
1904	16	20,000	80
Average for five years.....	....	....	71

The death rate during the last few years at Portsmouth has been far above the average rate for American cities and, as will be shown below, is fully as high as that of several cities which are noted for having excessive amounts of typhoid fever.

BEST METHODS FOR IMPROVING THE SUPPLY.

The State Board of Health after its investigations of the Ohio River in 1901 concluded, in part, as follows:

The Ohio River does not continuously furnish at any place along the border of this state a water that is suitable in the untreated condition to be used for a public supply.

Clear, wholesome, and safe water is at present being obtained in Ohio from this river only by filtration.

Good results may be obtained by use of a coagulant and mechanical filtration.

Plain subsidence as now in operation at Ohio cities and villages on the Ohio River fails to yield at all times a satisfactory water for a public supply.

Filtration undoubtedly affords the best means of purifying the water supply of Portsmouth and making it safe and satisfactory for all purposes.

On account of the high turbidities of the Ohio River water, the use of a coagulant is necessary, quite frequently, in order to obtain satisfactory purification. For this reason mechanical filtration is probably the method best adapted for Portsmouth.

It would also be very desirable to locate the intake above all local pollution from the city so that the water as taken into the filtration plant will be as pure as possible before treatment.

In making the above suggested improvements great care should be taken in designing and constructing a suitable intake so that the danger from clogging of the intake pipe by the large amount of silt, which occurs in the river at times, will be eliminated.

On account of the comparative softness of the Ohio River water it would be much better, for industrial as well as household purposes, to continue the use of the river water, if purified, rather than to seek a ground supply or use a small stream.

ADVANTAGES OF FILTERED WATER.

The best authorities unanimously agree that a properly operated filtration plant will produce a water quite as satisfactory, both from a sanitary and a physical standpoint, as that from the best natural sources of supply.

A plentiful supply of pure water in a city, leads the people to use water more freely and improves the health and sanitary aspect of the whole community. A city with an impure water supply soon becomes noted for this reason and is shunned by prospective residents and industrial establishments.

High typhoid rates in a city are undoubtedly due to a polluted water supply, either because the people use this supply or are forced, by the absence of pure water, to use contaminated wells.

A careful study of the available records of many cities which have installed filtration works has shown that the typhoid death rate has been reduced about 80 per cent. on account of the installation of filters.

Table II shows the high typhoid rate in a number of cities in the United States which have impure water supplies. Table III shows the low typhoid rates in cities in the United States and in Europe having filtered or other pure water supplies.

It should further be considered that a typhoid death rate does not represent the entire danger from this disease. The death rate may continue low for many years and then suddenly an epidemic may occur and the deaths within a few weeks may be more than the total number for

several years previous to such an epidemic. All cities having water supplies subject to pollution are liable to severe epidemics although the typhoid fever rate may be comparatively low for long periods.

TABLE II.

Showing typhoid fever death rate in principal cities in the United States which have sewage-polluted or otherwise impure water supplies, including the typhoid rate at Portsmouth.

City.	Population in 1900.	Typhoid death rate per 100,000.	Water supply.
Charleston, S. C.	55,087	122	Wells contaminated.
†Albany, N. Y.	94,151	*117	Polluted river, unfiltered.
†Youngstown, Ohio ...	44,885	114	Polluted river, unfiltered.
†Lorain, Ohio	16,028	*110	Polluted lake, unfiltered.
†Pittsburg, Pa.	321,616	108	Polluted river, unfiltered.
Troy, N. Y.	60,651	101	Polluted river, unfiltered.
†Allegheny, Pa.	129,896	86	Polluted river, unfiltered.
Johnstown, Pa.	35,936	83	Polluted river, unfiltered.
Wheeling, W. Va.	38,878	82	Polluted river, unfiltered.
Portsmouth, Ohio (last three years)	17,870	81	Polluted river, unfiltered.
Cleveland, Ohio.	381,768	72	Polluted lake water.
†Columbus, Ohio	125,560	70	Polluted river, unfiltered.
†Washington, D. C.	278,718	68	Polluted river, unfiltered.
†Norfolk, Va.	46,624	*64	Polluted river, unfiltered.
†Cincinnati, Ohio	325,902	62	Polluted river, unfiltered.
Superior, Wis.	31,091	63	Lake, unfiltered.
Duluth, Minn.	52,969	62	Lake, unfiltered.
Evansville, Ind.	59,007	60	Polluted river, unfiltered.
Spokane, Wash.	36,848	57	River, unfiltered.
Richmond, Va.	85,050	55	Polluted river, unfiltered.
†Philadelphia, Pa.	1,293,697	54	Polluted river, unfiltered.
†New Orleans, La.	287,104	54	River, unfiltered.
Reading, Pa.	78,961	50	Polluted river water.

*Previous to filtration.

†Filter now in use.

†Filter in process of construction or officially provided for.

TABLE III.

Showing typhoid fever death rate in principal American and European cities which have filtered or other pure water supplies.

City.	Population in 1900.	Typhoid death rate per 100,000.	Water supply.
Somerville, Mass....	61,643	20	Small stream, impounded and protected.
Newton, Mass.....	33,587	20	Wells, watershed owned by city and protected.
Manchester, N. H...	56,987	19	Lake, protected.
Cambridge, Mass....	91,886	18	Small stream, impounded and protected.
Worcester, Mass....	118,421	18	Lake, protected.
Lincoln, Neb.....	40,169	18	Unpolluted ground water.
Malden, Mass.....	33,664	16	Small stream, impounded and protected.
‡Lorain, Ohio.....	16,028	16	Polluted lake, filtered.
Fall River, Mass....	104,863	15	Small stream, impounded and protected.
Bridgeport, Conn. .	70,996	14	Small stream, impounded and protected.
Elizabeth, N. J.....	52,130	13	Small stream, impounded and protected.
Yonkers, N. Y.....	47,931	11	Small stream, impounded and protected.
Rockford, Ill.....	31,051	5	Deep wells.
EUROPEAN CITIES.			
Dresden	300,930	5	Unpolluted ground water.
Rotterdam.....	341,051	5	Polluted river, filtered.
The Hague.....	218,029	6	Dune water, filtered.
Vienna.....	1,435,931	7	Spring water.
Berlin.....	1,888,848	8	Polluted river, filtered.
Zurich.....	152,942	8	Polluted lake, filtered.
Breslau.....	353,551	10	Polluted river, filtered.
London.....	4,536,541	15	Polluted river, filtered.

‡Average for five years after filtration.

Typhoid fever generally attacks the younger and more active men and women and hence probably causes more real loss to a community than any other disease. Aside from the suffering that typhoid fever causes the patient and his family, it has been determined by the Pennsylvania State Board of Health, through its careful investigation of 1,153 cases at Plymouth, Pa., that the average cost of each case was \$840. This consists of the cost of medical attendance, nursing and loss of wages, but does not include the losses occasioned by death. The mortality among typhoid cases is about 10 per cent.

Portsmouth probably has 150 cases of typhoid each year. The financial loss is easily seen. A pure water supply would save its own cost within a short time. Furthermore, statistics show that when the typhoid death rate is reduced by the use of better water the death rate from all causes is also greatly reduced.

CONCLUSIONS.

1st. It is decidedly necessary to the health and welfare of Portsmouth that a pure water supply be provided.

2d. The most practicable method of providing such a supply would be to filter the Ohio River water.

3d. The intake for the waterworks should be carefully designed with reference to preventing clogging and should be placed above the influence of local pollution.

A copy of this report was sent to Mr. Smith, chairman of light and water committee of council of Portsmouth, March 14, 1905, and the hope expressed that council would take steps to actively push on the work of securing a pure water supply and offering such aid as the Board could render them.

REPORT ON AN INVESTIGATION OF AN OUTBREAK OF TYPHOID FEVER AT SCOTTOWN, LAWRENCE COUNTY.

September 10 and 11, 1905, the bacteriologist visited Scottown, Lawrence County, to investigate an outbreak of typhoid fever in that community and to ascertain, if possible, its origin. The following report was made:

Scottown has a population of about 75 people. In this place and the surrounding territory for a mile out there has appeared since July 4th, some 25 cases of typhoid fever with three deaths. Typhoid fever appears

to be endemic in that section but for the past thirty-four years prior to July, 1905, no case has originated in Scottown, although at intervals, of late years, a few scattering cases have come there either sick or convalescent. The dates of attacks as nearly as they could be determined were as follows: July 4th, 3; July 13th, 1; July 22d, 1; July 24th, 2; August 1st, 2; August 3d, 1; August 6th, 1; August 7th, 2; August 8th, 1; August 14th, 1; August 16th, 1; August 22d, 2; August 24th, 1; August 27th, 1; August 28th, 2; September 1st, 1; September 6th, 1; and September 9th, 1.

Plotting these cases by weeks gives a broken curve, indicating intermittent and continued infection and not one particular infection. A camp meeting was in session at Scottown the last three weeks of July and it seems probable that some of the cases of the first half of the outbreak obtained their infection in town at that time. A study of the data obtained shows this outbreak is not a direct milk infection since nearly every family is supplied with milk from a different cow. A consideration of the relationship of the cases, one to another, shows an unusually large percentage that can reasonably be considered as secondary cases. However, there is no evidence to lead one to think the people of this vicinity are more careless than elsewhere and the writer is inclined to believe that a number of the cases occurring subsequent to a previous case in a home or family were not merely "contagion cases" due to unusual carelessness.

On the other hand, while it is impossible to determine how far flies may have been a factor in this outbreak, yet it seems probable that a portion of the infection resulted in this manner. The opportunities for flies to carry the germs from typhoid material to victuals were unsurpassed. Few of the homes have any other arrangement for the disposal of excreta than the privy with deposits on top of the ground and hence most easily accessible to the flies abounding in that locality during the outbreak. The privies are in all cases near the house and screens were rarely used. While an attempt was made at disinfecting the stools and urine, in some cases, it is unquestionably a fact that much typhoid material was cast out in an undisinfected condition and therefore was a ready source of danger.

Scottown is located in a narrow valley between Big and Little Guyann creeks, just above their union, and is underlaid with a deposit of quicksand from which the wells draw their water. The wells are from 12 to 16 feet deep and in many of them the height of the water varies with the level of the water in the creek. While some of the wells may become roiled by the influence of surface water, yet it is probable that the wells are not directly contaminated from the creeks as thought by some, but the height of water in them is controlled rather, by hydrostatic pressure, i. e., the back pressure from the creek. This is indicated by the analytical results obtained from the samples taken from each creek and the various wells. It will be noticed the creek samples are much higher in alkalinity and lower in chlorides and nitrates than the well samples. The analytical

results obtained from the examination of the samples are given here, findings being stated in parts per million. All the wells are dug wells.

Number of Sample.	Source	Oxygen.	Alkalinity	Chlorine.	Nitrogen as		Bacteria.	Colon
					Nitrites	Nitrates		
4595	Massie well.....	.96	...	72.0	trace	8.0	650	yes in 1cc
4596	Harris well.....	1.24	...	32.0	.180	7.0	400	not in 50cc
4597	Joseph well.....	1.12	44	67.0	.018	14.0	5,600	yes in 1cc
4598	Pinkerman well...	1.46	...	.5	trace	1.0	1,000	not in 50cc
4599	Nance well.....	2.14	49	39.4	.014	18.0	21,300	not in 50cc
4600	Ruckers well....	1.64	24	56.2	.012	8.0	240	yes in 1cc
4601	Dunfee well.....	1.10	...	69.4	.006	22.0	160	not in 50cc
4602	Big Guyann Creek	3.78	116	4.2	.004	trace	550	yes in 1cc
4603	Sayre well.....	1.12	...	134.0	.004	36.0	450	yes in 50cc
4604	McCaffrey well...	1.06	...	18.4	.016	10.0	2,600	yes in 1cc
4605	Dobb well.....	1.34	...	33.6	.080	6.0	3,600	yes in 1cc
4606	Little Guyann Cr'k	2.26	99	7.4	.004	none	16,000	yes in 1cc
4607	Dickey well.....	2.80	...	57.2	.040	10.0	3,800	not in 50cc
4608	Rowe well.....	.90	69	17.6	.004	16.0	300	yes in 50cc
4609	Dillon well.....	2.26	221	20.4	trace	.6	850	yes in 1cc

It will be noticed that in most of the samples intestinal bacteria were present in 1 cubic centimeter or 50 cubic centimeter portions, thus indicating direct sewage influence in these wells. Furthermore, it will be noticed in the Harris, Nance, Dunfee and Dickey wells in which intestinal bacteria were not found, there appear in the chemical analyses high chlorides and nitrates together with high nitrites. The nitrates and chlorides are the end products from sewage pollution, signifying past sewage influence. The nitrites indicate that nature is beginning to fail in keeping up a complete purification, hence, while intestinal bacteria are not present in the wells mentioned, yet there is such a large amount of sewage influence together with the failing purification that their waters cannot be looked upon as safe ones for drinking purposes in the future. Although rather high in the number of bacteria, yet the Pinkerman well would be classed as usable from the determinations obtained. It is nearly free from nitrates and chlorides. This may come from the fact that it is situated close enough to the hill to escape any of the sewage pollution in the valley. The same would be expected of the Dillon well, only to a greater degree because of its close proximity to the hill. The Dillon water is a rock water from the hillside as indicated by its high alkalinity and low nitrates, but the trouble with the Dillon well is that typhoid stools have been deposited on the brow of the hill above the well and accordingly it cannot be looked upon as a safe water and especially so, since the analysis shows the presence of intestinal bacteria in 1 cubic centimeter portions. None of the waters containing intestinal bacteria can be considered safe for domestic use unless the water is boiled, because where intestinal bacteria are present

it is easy for typhoid germs to appear if there has been a typhoid discharge polluting the water.

The results indicate a very sad state of affairs, namely, the presence of typhoid fever cases in various parts of the valley; the deposit of infectious typhoid material in various privies and places; and an underlying quicksand yielding in nearly every well a water showing marked evidences of pollution.

CONCLUSIONS.

The investigation shows the prevalence of typhoid fever to an excessive degree in this community. It is probable that each of three factors is partially responsible for the later cases, namely, polluted drinking water, flies, and carelessness in handling patients and their excreta. I recommend that the greatest precaution be taken to prevent further infection and that an effort be made to secure a drinking water from near the foot of the hill and so located as to be free from any possibility of infection from the Dillon property.

A copy of this report was sent to the local health authorities and their attention called especially to the recommendations.

REPORT OF AN INVESTIGATION OF THE SANITARY CONDITION OF A SCHOOL HOUSE IN DISTRICT NO. 4, WINDSOR TOWNSHIP, LAWRENCE COUNTY. (SCOTTOWN).

Complaints were made to the State Board of Health in regard to the location and surroundings of a school house in District No. 4, Windsor Township, Lawrence County. The bacteriologist visited Scottown and in company with the director and a member of the school board made an inspection of the school house and surroundings. The following report was made:

This school house is located on the low land between Big Guyann Creek and one of its tributaries. It is surrounded by trees, some underbrush and a rank growth of weeds. In some places the weeds were fully 10 feet high. The school house is on a lower level than the highway and but little more than the roof is to be seen in driving along the road. The banks of the streams are of clay and when the water overflows a deposit of slimy mud is left around the school house. The hills of this vicinity are high and the valleys narrow, and in consequence the streams rise rapidly. The school house is frequently surrounded by water, this having occurred some ten times this year. On two different occasions the water has risen so rapidly and so high that the escape of a portion of the pupils

was cut off and they were obliged to remain in the schoolhouse over night. In the winter time the only way of access to the building is across a narrow foot-bridge and this becomes submerged in high water. There is but one privy and the mud and drift-wood on the privy walls, and on the neighboring trees, show that the water has been between two and three feet above the seat of the outhouse. It is said that the children frequently get their feet wet by breaking through the ice in the creek. The location is such as to exert a depressing effect rather than the elevating influence that is desirable in school locations.

There is but one room in the building and it is 29 feet long by 23 1-3 feet wide by 10 1-2 feet high. Based upon the attendance of last year there is not proper seating capacity for the sixty-two pupils. The average floor space is but 11 square feet and the cubic space but 115 for each pupil. These figures are much below the permissible standard.

There are three windows on the north side and three on the south side, with a transom over the door on the west end. There is no opening on the east end. The window space is but 15 per cent. of the floor space and, to make this even worse, the tops of the windows are 2 1-2 feet below the ceiling. Again, trees 16 to 18 feet away shade all three windows on the north side of the building. The remaining three windows are on the south side and light from the middle one is blocked by a bush just outside of the window. To cap the climax the interior walls are painted a very dark color, almost black. The blackboard is but little darker than the walls. In fact, inscriptions on the walls would indicate that they had been used at times for blackboard purposes. The ceiling is painted a dark bottle green. Under such conditions it is readily seen that enough light cannot enter to make the room a cheerful one. Instead, it is the gloomiest schoolroom the writer was ever in.

It was the testimony of the physician in that locality that the children attending this school gave a much higher percentage of catarrhal conditions, tonsillitis and hay fever tendencies than did other children of his practice in that section of the country, while some families were unable to send their children to this school more than a few days during the winter season before the physician had to be called to attend them. Some of the parents positively stated they would not send their children to this school, and it is said that families moving from the neighborhood have given as one of the reasons, that they were seeking a properly located school to which to send their children. While all who were interviewed admitted the bad location, yet a few were found that objected to the moving of the school house or building a new one on account of expense, but, in fairness, it should be stated that most of these did not have children of school age.

School was to have opened the morning of the inspection but only three pupils appeared. Typhoid fever in the community was responsible for the absence of some and others would not begin school until later in the fall, as is the practice in rural districts.

The investigation shows that the schoolhouse is located in a most unfavorable and unsanitary place and it is a very objectionable place to send children for several hours each day. There is no source from which to obtain drinking water at the school house and when the creek is impassable it will be necessary to bring the water a long distance or obtain it at a house where typhoid fever now exists.

EXAMINATIONS MADE IN THE
LABORATORY

WORK OF THE LABORATORY.

This part of the report deals with the various examinations made in the laboratory during the year ending December 31, 1905. The work has been done by Mr. Elmer G. Horton, bacteriologist and chemist in charge of the laboratory, assisted by Miss Caroline B. Richardson and Mr. C. B. Young. The number of examinations during the year was 2,882 as compared with 1,906 during the preceding year.

In addition to the routine work the laboratory engaged in the following special investigations:

- a. An outbreak of sickness at Irondale.
- b. Typhoid fever at Bowling Green.
- c. Typhoid fever at Scottown.
- d. The sanitary condition of the school house in district No. 4, Windsor Township, Lawrence County.
- e. Occasional examinations of certain public water supplies.
- f. The efficiency of filtration in public water supplies in Ohio.
- g. The cause of disagreeable odors and an effect upon painted buildings at New Philadelphia.
- h. A study of sewage effluents, manufacturing wastes, and stream pollutions in co-operation with the United States Geological Survey.

The expenses of the laboratory during the year were:

Salaries.....	\$3,465 50
Equipment, apparatus, supplies and incidentals.....	1,734 56
Traveling expenses.....	321 58
Total.....	<u>\$5,521 64</u>

EXAMINATIONS OF DIPHTHERIA SPECIMENS.

Place.	Number of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Alliance	7	3	..	4	..	..	..
Athens	1	..	..	..	1	..	..
Batavia	2	..	..	..	2	..	..
Bellaire	2	1	1	..	..	..	..
Butler-Liberty	1	..	..	1	..	..	..
Cadiz	3	2	1	..	..	..	..
Camden	1	..	..	..	..	1	..
Canton	4	1	1	1	1	..	..
Celina	1	..	..	..	1	..	..
Chillicothe	2	1	..	1	..	..	..
Clermont-Union	1	..	1	..	..	..	..
Columbiana-Washington	1	1	..	..	..	..	..
Columbus Grove	1	..	..	1	..	..	..
Cuyahoga-Brooklyn	1	..	1	..	..	..	..
Defiance	6	2	..	2	2	..	..
Eaton	6	1	1	2	1	1	..
Elgin	2	..	..	1	1	..	..
Elyria	10	4	2	2	2	..	..
Fairview	1	1	..	..	..	..	..
Franklin-Brown	1	..	..	1	..	..	..
Fremont	1	..	..	..	1	..	..
Galion	1	..	..	..	1	..	..
Gallia	1	1	..	..	..	..	..
Geauga-Huntsburg	2	..	1	1	..	..	..
Greene-Beaver Creek	1	..	..	..	1	..	..
Greenville	2	1	1	..	..	..	..
Guernsey-Oxford	1	..	1	..	..	..	..
Hamilton	7	1	1	4	1	..	..
Hamilton-Columbia	1	..	..	1	..	..	..
Hanoverton	2	1	1	..	..	..	..
Hilliard	1	..	..	1	..	..	..
Huntsburg	1	..	1	..	..	..	..
Ironton	2	1	..	1	..	..	..
Jackson	1	..	..	1	..	..	..
Jackson-Washington	2	..	..	2	..	..	..
Jamestown	1	..	..	..	..	..	1
Jefferson-Spring	2	..	..	1	1	..	..
Kent	1	1	..	..	..	..	..
Lakeside	6	..	2	3	1	..	..
Lebanon	2	..	1	1	..	..	..
Lima	11	2	1	5	3	..	..
Logan	2	..	1	..	1	..	..
Lorain	3	..	..	1	2	..	..
Lorain-Brownhelm	1	1	..	..	..	..	..
Lorain-Ridgeville	2	1	..	..	1	..	..
Loveland	5	2	1	1	1	..	..
Magnolia	3	..	2	..	1	..	..
Marblehead	8	5	1a	1	1	..	..
Martins Ferry	1	..	..	1	..	..	..
Massillon	1	..	1	..	..	..	..
Mansfield	1	1	..	..	..	..	..

EXAMINATIONS OF DIPHTHERIA SPECIMENS—Concluded.

Place.	Number of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
McArthur.....	7	3	1	2	1	..	..
Milford.....	2	1	..	..	1	..	..
Montpelier.....	3	..	..	2	1	..	..
Morgan-Marion.....	2	..	..	..	..	..	2
Mowrystown.....	1	1	..	..	..	..	..
Mt. Orab.....	1	1	..	..	..	..	..
Mt. Vernon.....	2	1	..	1	..	..	..
New Albany.....	1	..	..	1	..	..	..
Newark.....	2	..	..	..	2	..	..
New Lexington.....	25	9	4	8	4	..	..
New Matamoras.....	1	..	..	1	..	..	..
Niles.....	1	1	..	..	..	..	..
Oakwood.....	1	..	..	1	..	..	..
Ottawa-Danbury.....	29	1	5	17	6	..	..
Ottawa-Erie.....	1	..	..	1	..	..	..
Pataskala.....	2	..	..	2	..	..	..
Perry-Coal.....	2	1	..	..	1	..	..
Perry-Pleasant.....	2	1	1	..	..	..	..
Piqua.....	1	1	..	..	..	..	..
Pleasant Ridge.....	1	..	..	..	1	..	..
Port Clinton.....	10	2	2	4	2	..	..
Port Jefferson.....	1	1	..	..	..	..	..
Portsmouth.....	2	1	..	1	..	..	..
Preble-Israel.....	2	1	..	..	1	..	..
Preble-Washington.....	3	2	..	1	..	..	..
Rarden.....	1	..	..	..	1	..	..
Ross-Twin.....	1	1	..	..	..	..	..
Sandusky.....	3	2	..	1	..	..	..
Sidney.....	2	..	..	2	..	..	..
South Zanesville.....	1	..	1	..	..	..	..
Springfield.....	1	..	..	1	..	..	..
Terrace Park.....	2	1	..	1	..	..	..
Thornville.....	2	2	..	..	..	..	..
Thurman.....	1	..	1	..	..	..	..
Tiffin.....	4	1	..	3	..	..	..
Trumbull-Kinsman.....	4	..	..	1	2	1	..
Trumbull-Vernon.....	2	1	..	1	..	..	..
Vinton-Clinton.....	1	..	..	..	1	..	..
Waldo.....	1	..	..	..	1	..	..
Wapakoneta.....	1	1	..	..	..	..	..
Waverly.....	1	..	1	..	..	..	..
Wellston.....	1	..	..	1	..	..	..
West Alexandria.....	1	..	..	1	..	..	..
West Carrollton.....	1	..	..	1	..	..	..
West Union.....	12	7	1	2	2	..	..
Woodstock.....	1	..	..	..	1	..	..
Xenia.....	9	4	2	2	1	..	..
Zanesville.....	8	4	..	3	1	..	..
Total.....	296	87	42	104	57	3	3

65.5 per cent. positive findings.

a, unsatisfactory.

EXAMINATIONS OF TYPHOID SPECIMENS.

Place.	Number of samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Akron.....	12	6	3	1	2	..	..
Alliance.....	4	1	..	3	..	..	..
Ashland.....	1	..	1	..	..	..	..
Ashtabula.....	1	..	..	1	..	..	..
Cambridge.....	2	..	1	1	..	..	..
Canton.....	4	2	..	..	2	..	..
Celina.....	1	..	1	..	..	..	..
Chillicothe.....	8	5	1	2	..	..	..
Columbus.....	1	1	..	..	..	..	..
Defiance.....	2	..	..	1	1	..	..
East Liverpool.....	1	..	1a	..	..	..	..
Eaton.....	6	4	..	1	1	..	..
Fremont.....	1	..	1	..	..	..	..
Grafton.....	1	..	..	1	..	..	..
Greenfield.....	10	5	2	3	..	..	..
Hicksville.....	1	..	..	1	..	..	..
Ironton.....	1	..	..	..	1	..	..
Jackson.....	5	2	1	1	1	..	..
Jackson-Jefferson.....	2	..	1a	..	1a	..	..
Jefferson.....	2	1	..	1	..	..	..
Licking-Harrison.....	1	..	..	1	..	..	..
Licking-Lima.....	1	..	..	1	..	..	..
Lima.....	1	..	1	..	..	..	..
London.....	2	1	..	1	..	..	..
Mansfield.....	12	4	5	2	1b	..	..
Martins Ferry.....	3	3	..	..	..	..	..
Medina.....	3	3	..	..	..	..	..
Mt. Gilead.....	2	..	..	2	..	..	..
Mt. Vernon.....	6	2	2	2	..	..	..
New Lexington.....	2	1	..	1	..	..	..
Niles.....	1	..	1	..	..	..	..
Norwood.....	1	..	..	..	1	..	..
Paulding.....	2	1	1	..	..	..	..
Piqua.....	1	..	..	..	1	..	..
Plain City.....	2	1	1	..	..	..	..
Rendville.....	1	..	..	1	..	..	..
Sandusky.....	4	2	..	2	..	..	..
Sandusky-Jackson.....	1	1	..	..	..	..	..
Seville.....	1	1	..	..	..	..	..
Sidney.....	4	1	1	1	1	..	..
South Charleston.....	1	..	..	1	..	..	..
Spencerville.....	1	..	..	1	..	..	..
Stark-Jackson.....	1	1	..	..	..	..	..
Vandalia.....	1	..	..	1	..	..	..
Vinton-Clinton.....	4	1	..	1	2	..	..
Washington C. H.....	1	..	..	..	..	1	..
Washington-Grandview.....	1	1	..	..	..	..	..
Waverly.....	2	2	..	..	..	..	..
Wellston.....	5	..	1	2	2	..	..
Yorkshire.....	1	..	1	..	..	..	..
Zanesville.....	6	2	..	3	1	..	..
Totals.....	141	55	27	40	18	1	..

68.1 per cent positive findings.

a, unsatisfactory; b, partial reaction.

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE BACILLI.

Place.	Number of samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Adams-Scott.....	1	..	..	..	1	..	..
Akron.....	30	6	6	9	9	..	..
Alliance.....	1	..	1	..	..	..	..
Amanda.....	3	..	2	1	..	..	..
Andover.....	2	..	1	..	1	..	..
Ashland.....	5	..	..	2	3	..	..
Ashley.....	2	..	..	2	..	..	..
Ashtabula.....	4	4	..	..	..	..	..
Ashtabula-Austinburg.....	3	1	2	..	..	..	..
Ashtabula-Rome.....	2	1	1	..	..	..	..
Athens.....	11	3	3	..	5	..	..
Athens-Athens.....	2	..	2	..	..	..	..
Athens-Lodi.....	3	..	1	2	..	..	..
Athens-Rome.....	1	..	..	..	1	..	..
Bainbridge.....	2	..	..	2	..	..	..
Batavia.....	8	2	1	1	4	..	..
Beach City.....	1	..	..	..	1a	..	..
Bellevue.....	4	2	..	..	2	..	..
Belmont-Pease.....	1	..	..	..	1	..	..
Bloomfield.....	2	..	..	..	2	..	..
Botkins.....	1	..	1	..	..	..	..
Bowling Green.....	1	..	..	..	1	..	..
Bradford.....	2	..	2	..	..	..	..
Bremen.....	1	..	..	..	1	..	..
Bridgeport.....	3	..	..	3	..	..	..
Brooklyn Heights.....	1	..	..	1	..	..	..
Broughton.....	1	..	..	1	..	..	..
Brown-Pike.....	1	..	..	1	..	..	..
Brown-Washing.....	1	..	..	1	..	..	..
Bucyrus.....	15	2	7	4	2	..	..
Butler-Liberty.....	1	..	1	..	..	..	..
Byesville.....	1	..	..	1	..	..	..
Cadiz.....	1	..	..	1	..	..	..
Cambridge.....	3	..	2	1	..	..	..
Canal Dover.....	4	3	1	..	..	..	..
Canal Fulton.....	1	..	..	1	..	..	..
Canfield.....	1	..	..	1	..	..	..
Canton.....	27	4	9	5	{6 1b	..	1
Carroll-Augusta.....	2	..	..	1	{1c	..	..
Carroll-Brown.....	3	..	..	..	{2 1c	..	..
Carroll-Lee.....	1	..	..	1	..	..	..
Carrollton.....	2	..	2	..	..	..	..
Casstown.....	1	..	..	1	..	..	..
Cecil.....	1	..	..	..	..	1	..
Celina.....	5	1	1	2	1	..	..
Chardon.....	1	..	..	..	1	..	..
Chicago.....	1	..	1	..	..	..	..
Chillicothe.....	8	5	..	1	..	2	..
Cincinnati.....	1	1	..	..	..	..	..

EXAMINATIONS OF SPECIMENS OF SPUTUM FOR TUBERCLE
BACILLI—Continued.

Place.	Number of samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Circleville	7	3	1	2	1	..	..
Cleveland	1	..	..	1	..	..	..
Columbiana	1	..	..	..	1	..	..
Columbiana-St. Clair	1	1	..	..	..	..	..
Columbiana-West	1	..	..	1	..	..	..
Columbus	17	4	3	1	8	1	..
Columbus Grove	3	..	2	..	1	..	..
Conneaut	4	..	1	1	2	..	..
Convoy	1	..	..	1	..	..	..
Coshocton	1	..	..	1	..	..	..
Coshocton-Clark	2	..	..	..	2	..	..
Crawford-Lykens	1	..	..	1	..	..	..
Crestline	2	1	1	..	..	..	..
Cridersville	1	..	..	1	..	..	..
Crooksville	1	..	..	..	1	..	..
Darke-Allen	1	..	..	..	1	..	..
Darke-Wabash	1	..	..	1	..	..	..
Dayton	1	..	1	..	..	..	..
Deavertown	2	1	..	1	..	..	..
Defiance	10	3	1	5	1	..	..
DeGraff	3	1	1	..	1	..	..
Delaware	25	9	7	..	1	..	..
			1c				
			1d	4	3	..	..
Delaware-Berkshire	2	..	..	..	2	..	..
Delaware-Orange	1	1	..	..	..	..	..
Delphos	2	..	..	..	2	..	..
Dennison	1	..	..	1	..	..	..
Dunkirk	1	1	..	..	..	..	..
East Liverpool	6	..	2	3	1	..	..
East Palestine	6	..	..	2	4	..	..
Eaton	5	1	..	1	3	..	..
Edgerton	2	..	1	..	1	..	..
Eldorado	2	..	..	..	2	..	..
Elida	2	1	..	..	1	..	..
Elyria	2	..	2	..	..	..	..
Everett	1	..	1	..	..	..	..
Farmersville	2	1	..	..	1	..	..
Fletcher	2	..	1	1	..	..	..
Fostoria	2	1	..	1	..	..	..
Franklin-Jefferson	1	..	..	..	1	..	..
Fremont	6	2	..	1	3	..	..
Galion	7	1	4	1	1	..	..
Gallia-Clay	1	1	..	..	..	..	..
Gallia-Greenfield	2	..	1	1	..	..	..
Gallia-Huntington	1	..	..	..	1	..	..
Gallia-Springfield	1	..	..	1	..	..	..
Gallia-Walnut	3	..	..	1	2	..	..
Gallipolis	1	..	..	..	1	..	..
Geauga-Huntsburg	1	..	..	..	1	..	..

EXAMINATION OF SPECIMENS OF SPUTUM FOR TUBERCLE
BACILLI—Continued.

Place.	Number of Samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Geauga-Thompson.....	1	..	..	..	1	..	..
Georgetown.....	2	..	..	..	2	..	..
Germantown.....	1	..	..	..	1	..	..
Gettysburg.....	1	..	..	..	1	..	..
Geneva.....	1	..	1	..	..	..	..
Gibsonburg.....	1	..	..	1	..	..	..
Glandorf.....	3	..	..	2	1	..	..
Grafton.....	2	1	1	..	..	..	..
Greene-Beaver Creek.....	2	..	..	2	..	..	..
Greenfield.....	5	..	1	3	1	..	..
Greenville.....	11	2	..	2	7	..	..
Grover Hill.....	2	..	..	1	1	..	..
Guernsey-Madison.....	2	1	..	..	1	..	..
Hamden Junction.....	1	1	..	..	..	..	..
Hamilton.....	8	3	1	3	1	..	..
Hanging Rock.....	1	..	..	..	1	..	..
Hanoverton.....	1	..	1	..	..	..	..
Hartford.....	1	..	1	..	..	..	..
Harrison-Shortcreek.....	1	..	..	..	1	..	..
Henry-Pleasant.....	1	..	1	..	..	..	..
Highland-Fair.....	1	..	..	..	1	..	..
Hocking-Good Hope.....	1	..	..	..	1	..	..
Hocking-Ward.....	3	..	..	1	2	..	..
Holgate.....	2	..	1	..	..	..	1
Hubbard.....	5	1	..	2	2	..	..
Ironton.....	10	3	1	4	2	..	..
Jackson.....	2	..	2	..	..	..	..
Jackson Center.....	3	..	1	..	2	..	..
Jefferson.....	1	..	..	..	1	..	..
Jefferson-Spring.....	1	..	..	1	..	..	..
Jefferson-Wayne.....	1	..	1	..	..	..	..
Kalida.....	1	1	..	..	..	..	..
Kent.....	1	..	..	..	1	..	..
Killbuck.....	1	..	..	1	..	..	..
Kingston.....	1	1	..	..	..	..	..
Kinsman.....	1	..	..	..	..	1	..
Lake-Madison.....	1	..	..	1	..	..	..
Lakeside.....	2	..	..	..	2	..	..
Lakewood.....	3	..	1	..	2	..	..
Lancaster.....	5	..	1	1	2	..	..
Latty.....	1	1	..	..	1c	..	..
Lawrence-Aid.....	1	..	..	1	..	..	..
Lawrence-Elizabeth.....	1	..	..	1	..	..	..
Lawrence-Lawrence.....	1	..	..	..	1	..	..
Lawrence-Union.....	6	..	1	3	2	..	..
Lebanon.....	10	1	2	3	4	..	..
Lima.....	9	3	2	2	2	..	..
Lindsey.....	1	..	..	1	..	..	..
Lisbon.....	2	1	..	..	1	..	..

EXAMINATION OF SPECIMENS OF SPUTUM FOR TUBERCLE
BACILLI—Continued.

Place.	Number of samples.	Result..					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Logan.....	1	..	..	1	..	..	..
Logan-Washington.....	3	3	..	..	..	..	..
London.....	11	1	5	2	3	..	..
Lorain.....	1	..	..	..	1	..	..
Lorain-Camden.....	1	..	..	..	1	..	..
Louisville.....	1	..	1	..	..	..	..
Madisonville.....	2	..	..	1	1	..	..
Mogadore.....	1	..	..	..	1	..	..
Magnolia.....	1	..	..	..	1	..	..
Mahoning-Austintown.....	1	..	..	..	1	..	..
Malvern.....	3	..	3	..	..	..	..
Mansfield.....	4	1	1	..	2	..	..
Mantua.....	1	..	1	..	..	..	..
Marietta.....	4	1	..	2	1	..	..
Marion-Tully.....	3	..	2	..	1	..	..
Martins Ferry.....	2	2	..	..	..	..	..
Marysville.....	9	2	4	3	..	..	..
McArthur.....	1	..	..	..	1	..	..
Medina.....	3	..	1	1	1	..	..
Medina-Brunswick.....	1	..	..	1	..	..	..
Miami-Brown.....	1	..	..	1	..	..	..
Miamisburg.....	1	..	..	..	1	..	..
Mifflin.....	1	..	1	..	..	..	..
Milford.....	2	..	1	..	1	..	..
Morrow-Lincoln.....	1	..	1	..	..	..	..
Mt. Gilead.....	7	..	2	1	4	..	..
Mt. Pleasant.....	1	..	..	1	..	..	..
Mt. Sterling.....	3	2	..	1	..	..	..
Mt. Vernon.....	12	2	4	2	4	..	..
Murray.....	2	..	..	1	1	..	..
Muskingum-Licking.....	2	..	2	..	..	..	..
Napoleon.....	1	..	..	1	..	..	..
Newark.....	5	1	3	..	1c	..	..
New Athens.....	2	1	..	..	1	..	..
Newcomerstown.....	2	..	1	1	..	..	..
New Lexington.....	7	1	..	2	4	..	..
New Madison.....	1	..	..	1	..	..	..
New Paris.....	1	..	..	..	1	..	..
New Philadelphia.....	1	..	..	..	1	..	..
New Washington.....	3	1	..	2	..	..	..
New Vienna.....	2	1	1	..	..	..	..
Nevada.....	1	..	..	1	..	..	..
Niles.....	1	1	..	..	..	..	..
Noble-Marion.....	1	..	1	..	..	..	..
Noble-Middle Creek.....	2	..	1	..	1	..	..
North Robinson.....	1	..	..	1	..	..	..
Norwalk.....	1	..	1	..	..	..	..
Oak Harbor.....	3	..	..	2	1	..	..
Oberlin.....	2	2	..	..	..	..	..
Ottawa.....	1	1	..	..	..	..	..

EXAMINATION OF SPECIMENS OF SPUTUM FOR TUBERCLE
BACILLI—Continued.

Place.	Number of samples.	Result.					
		Male.		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Ottawa-Allen.....	1	..	1	..	..	..	..
Ottawa-Catawba Island.....	2	..	..	1	1	..	..
Ottawa-Clay.....	1	1	..	..	..	..	..
Ottawa-Portage.....	1	1	..	..	..	..	..
Paulding.....	1	..	..	1	..	..	..
Payne.....	1	..	..	..	1	..	..
Perry-Bearfield.....	1	..	1	..	..	..	..
Pickerington.....	1	..	..	1	..	..	..
Pike-Sunfish.....	1	..	..	1	..	..	..
Piqua.....	7	3	1	2	1	..	..
Plain City.....	2	..	..	..	2	..	..
Port Clinton.....	12	1	2	3	6	..	..
Port Jefferson.....	1	1	..	..	..	..	..
Portsmouth.....	9	3	..	3	3	..	..
Port Washington.....	2	..	..	1	1	..	..
Prospect.....	4	3	..	1	..	..	..
Rawson.....	1	..	..	..	1	..	..
Ravenna.....	1	..	..	..	..	..	1
Richwood.....	1	..	..	..	1	..	..
Russellville.....	1	..	..	..	1	..	..
St. Paris.....	5	1	2	1	1	..	..
Salem.....	8	3	2	3	..	..	..
Sandusky.....	9	5	1	1	2	..	..
Savannah.....	2	..	1	1	..	..	..
Scioto-Porter.....	2	1	..	..	1	..	..
Seneca-Liberty.....	1	..	..	..	1	..	..
Senecaville.....	1	..	..	1	..	..	..
Shelby.....	1	..	..	..	1	..	..
Shelby-Salem.....	2	..	..	1	1	..	..
Shelby-Washington.....	1	..	..	..	1	..	..
Sheridan.....	1	1	..	..	..	..	..
Sidney.....	6	2	2	2	..	..	..
Smithfield.....	1	..	..	1	..	..	..
South Point.....	2	..	2	..	..	..	..
Spencerville.....	13	1	1	5	5	..	1
Spring Valley.....	1	..	..	..	1	..	..
Steubenville.....	9	3	2	3	1	..	..
Stone Creek.....	1	..	..	1	..	..	..
Strasburg.....	2	..	1	..	1	..	..
St. Marys.....	2	..	..	..	1	..	1
Summit-Bath.....	1	..	..	..	1	..	..
Summit-Boston.....	1	1	..	..	..	..	..
Summit-Green.....	1	..	..	1	..	..	..
Summit-Richfield.....	1	..	1	..	..	..	..
Sylvania.....	3	..	..	1	2	..	..
Tiffin.....	9	2	..	5	2	..	..
Tippecanoe.....	4	2	1	1	..	..	..
Tiro.....	2	..	..	1	1	..	..
Toronto.....	1	1	..	..	..	..	..
Trotwood.....	5	2	1	2	..	..	..

EXAMINATION OF SPECIMENS OF SPUTUM FOR TUBERCLE
BACILLI—Concluded.

Place.	Number of Samples.	Result.					
		Male		Female.		Sex not stated.	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Troy.....	3	2	..	1	..	..	..
Trumbull-Kinsman.....	2	..	1	1	..	..	..
Tuscarawas-Bucks.....	1	..	..	..	1	..	..
Tuscarawas-Jefferson.....	1	..	..	1	..	..	..
Tuscarawas-Wayne.....	1	..	1	..	..	..	..
Uhrichsville.....	8	..	2	4	2	..	..
Upper Sandusky.....	5	1	..	3	1	..	..
Urbana.....	1	..	1d	..	..	..	..
Utica.....	5	1	2	..	2	..	..
Van Wert.....	6	..	3	1	2	..	..
Versailles.....	4	2	..	2	..	..	..
Vinton-Clinton.....	1	..	..	..	1e	..	..
Wadsworth.....	1	..	1	..	..	..	..
Warren-Deerfield.....	1	..	1	..	..	..	..
Warsaw.....	1	1	..	..	..	..	..
Washington-Adams.....	1	..	1	..	..	..	..
Washington-Barlow.....	2	..	..	2	..	..	..
Washington C. H.....	2	2	..	..	..	..	..
Washington-Grandview.....	1	1	..	..	..	..	..
Waynesburg.....	1	..	..	..	1	..	..
Wellington.....	1	..	1	..	..	..	..
Wellston.....	3	..	..	1	2	..	..
Wellsville.....	4	..	1	1	2	..	..
West Alexandria.....	3	..	1	1	1	..	..
West Lodi.....	1	..	..	..	..	..	1
West Union.....	1	..	..	1	..	..	..
Wilmington.....	3	1	1	1	..	..	..
Winterset.....	2	..	1	1	..	..	..
Xenia.....	3	..	1	1	1	..	..
Youngstown.....	4	..	..	1	2	..	1
Zanesville.....	11	..	6	3	2	..	..
Totals.....	814	159	183	218	242	5	7

46.9 per cent. positive findings.

a, unsatisfactory; b, suspicious; c, not examined; d, degenerate forms.

MISCELLANEOUS EXAMINATIONS.

Laboratory No.	Place:	No. of samples.	Nature of sample.	Examined for.	Remarks.
187,192	Ashtabula.....	2	Pus.....	Tubercle bacilli.	Negative.
176	Augl'ze-Goshen	1	Pork.....	Trichina.....	Present.
220	Barberton.....	1	Cheese.....	Quality.....	Unwholesome.
215	Bucyrus.....	1	Empyemic fluid	Tubercle bacilli.	Negative.
221	Carrollton.....	1	Rock.....	Organic matter	Low.
183,184	Circleville.....	2	Dogs.....	Rabies.....	Positive.
209	Circleville.....	1	Pleuritic effusion.....	Tubercle bacilli.	Negative.
219	Clyde.....	1	Water.....	Insects.....	Aphididæ.
180	Columbus.....	1	Manuf. plant...	Feasibility of disinfecting clothing of employes....	
210	Col'bus Grove..	1	Feces.....	Tubercle bacilli.	Positive.
194	Coshocton-Mill Creek.....	1	Heifer's head...	Rabies.....	Positive.
186	Defiance.....	1	Lymph node...	Tubercle bacilli.	Positive.
207	Dennison.....	1	Pus.....	Tubercle bacilli.	Negative.
202-205	East Liverpool.	4	Ice.....	Quality.....	Good.
182	Farmersville...	1	Blood.....	Anthrax.....	Negative.
216	Franklin-Marion.....	1	Dog.....	Rabies.....	Positive.
201	Fremont.....	1	Abdominal fluid	Tubercle bacilli.	Negative.
175	Glendale.....	1	Ice.....	Quality.....	Fairly good.
188	Ironton.....	1	Pus.....	Tubercle bacilli.	Negative.
212	Jackson.....	1	Ice.....	Quality.....	Good.
206	Jamestown....	1	Pus.....	Tubercle bacilli.	Positive.
197	Jerry City.....	2	Worms.....	Identification ..	Oxyuris vermicularis.
173	London.....	1	Dog.....	Rabies.....	Positive.
199	Marysville....	1	Pus.....	Tubercle bacilli.	Negative.
178	Miamisburg....	1	Ice.....	Quality.....	Fair.
208	Miamisburg....	1	Pus.....	Tubercle bacilli.	Negative.
172	New Riegel....	1	Dog's head....	Rabies.....	Positive.
196	Piqua.....	1	Dog.....	Rabies.....	Positive.
191	Portsmouth...	1	Feces.....	Tubercle bacilli.	Negative.
200	Rock Creek....	1	Pleuritic fluid..	Tubercle bacilli.	Positive.
174	Roseville.....	1	Water.....	Insects.....	Crustaceans.
193	Salem.....	1	Scrotal ulcer...	Tubercle bacilli.	Positive.
179	Steubenville...	1	Milk.....	Cause of color..	Not B. prodigiosus; aniline (?).
195	Sycamore.....	1	Pus.....	Tubercle bacilli.	Negative.
190,198	Tiffin.....	2	Dogs' heads...	Rabies.....	One positive, one negative.
217	Tiffin.....	1	Blood.....	Malaria.....	Negative.
181	Waynesburg...	1	Water.....	Sediment.....	Crenothrix and iron.
189	Wellston.....	1	Cerebro spinal fluid.....	Tubercle bacilli.	Negative.
211}	Wellston.....	3	Ice.....	Quality.....	One suitable, one not suitable, one undesirable.
213}					
214}					
218	West Carlisle..	1	Dog.....	Rabies.....	Positive.
171	Worthington...	1	Mouthpiece of tin horn.....	Diphtheria....	Present.
185	Zanesville....	1	Ice.....	Quality.....	Good.
	Total.....	51			

CO-OPERATIVE WORK WITH THE UNITED STATES GEOLOGICAL SURVEY.

In the co-operative work with the U. S. G. S. 126 samples of sewages, manufacturing wastes, and waters from various streams were examined. The results are given elsewhere in a special report.

EXAMINATIONS OF WATERS.

REPORT ON EXAMINATIONS OF SAMPLES OF WATER PROPOSED AS PUBLIC WATER SUPPLIES.

The analytical results of samples from sources proposed for public supplies or as additions to existing supplies, together with extracts from the report of the bacteriologist and chemist, are given for the various cities and villages considered during the year 1905. For complete information see Report on Proposed Public Water Supplies.

EXAMINATION OF WATER FROM ARCANUM. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
*4277	April 13....	30	10	very slight	none	.052	.038	.002	trace
*4278	April 13....	25	..	.....	.....	....	....	.002	none
4327	June 6	25	20	slight	earthy	.056	.018	.004	none

*Preliminary to proposed supply.

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4277	.27	15.7	298	42	.5	452	64	475	not in 50cc
4278	.....	.....	.....	.....	.....	.....	.....	450	yes in 50cc
4327	1.18	6.5	247	15	1.2	384	52	650	not in 50cc

No. 4277. Big Four drilled well. Collected by Mr. R. W. Pratt, engineer.

No. 4278. Creamery driven well. Collected by Mr. R. W. Pratt, engineer.

No. 4327. Drilled well 800 feet south of Big Four Railroad and east of D. & U. R. R. Collected by Dr. W. A. Jones.

No. 4.277. The results indicate sub-surface water of fair quality, The Big Four drilled well sample failed to show vegetative organic pollution, intestinal bacteria, or other evidences of fresh sewage pollution. In its present condition it is suitable for a public supply, although moderately hard.

No. 4.278. No chemical sample was taken from the Creamery well and as the bacteriological bottle was but partially filled some of the determinations had to be omitted. The objectionable factor in the Creamery sample is the presence of intestinal bacteria when 50 c. cm. of the sample were used for the test. The low number of bacteria as well as the absence of intestinal bacteria in two portions of 1 cc. each, would indicate that there is only a minor pollution of this water.

The analyses failed to show the evidences of surface pollution at this time.

No. 4.327. The results show a water that is slightly turbid and contains a little iron, but these findings may improve after the well has been pumped for a longer period. The water, although hard is only moderately hard for an Ohio ground water. The results are comparatively good as regards organic pollution and therefore the water is a usable one for a public supply and should prove acceptable barring minor complaints in reference to the presence of a little iron and the consequent lack of clearness.

EXAMINATION OF WATER FROM COLUMBUS, OHIO INSTITUTION FOR THE EDUCATION OF THE DEAF AND DUMB. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4520	August 10...	25	35	distinct	faint	.042	.130	none	none
4623	Sept. 15....	9	18	distinct	peculiar	.006	.192	none	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4520	.84	6.5	321	52	1.2	460	61	1500	not in 50cc
4623	.58	8.0	326	41	1.2	467	55	200	not in 50cc

No. 4520. Collected by Thomas Cureton from driven test well No. 4.

No. 4623. Collected by Supt. J. W. Jones from driven test well No. 4.

No. 4520. The results show a higher free ammonia than would be expected and also a higher number of bacteria than is desirable in a well that has been pumped as thoroughly as this one had. The other chemical findings and the absence of intestinal bacteria show that the water is a usable one although it has some undesirable features. Comparing this water with the old supply as examined in February, 1904, and March, 1905, it is seen the proposed supply is less desirable than the old supply because it contains more organic matter and shows a turbidity and sediment making the water slightly objectionable in appearance. There is considerable iron present and this, also, is undesirable. The proposed water is somewhat softer than the old supply but it is still to be classed as a hard water. The analysis indicates a water that at the present time is usable but contains some undesirable features.

No. 4623. This sample was taken after continued pumping. The water is much the same as in the previous analysis as regards its inorganic character. The iron and hardness are practically the same. The chlorides and free ammonia have increased while the number of bacteria has decreased. This increase in chlorides and free ammonia on pumping is not

a favorable indication. Like the previous sample the analysis indicates a water that at the present time is usable but contains some undesirable features.

EXAMINATION OF WATER FROM COLUMBUS, STATE HOUSE. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4583	Sept. 1.....	15	45	distinct	ft. sulphur	.030	.040	none	none
4585	Sept. 2.....	..	..	.....	.....	....	....	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4583	.87	29.8	369	153	4.0	802	149	135	not in 50cc
4585	.67	29.8	....	....	....	.....	.....	125	not in 50cc

Drilled well in basement of State House. Samples collected by E. G. Horton.

No. 4,583 was taken after four hours pumping and No. 4,585 after some 26 hours pumping. The number of bacteria and the absence of colon bacilli together with the findings for oxygen required and the nitrogens indicate that this water is, in its present condition, comparatively free from fresh organic pollution and a safe one to drink. It will be noticed by the alkalinities, incrustants, and total solids that the water is high in mineral matter and excessively hard, even considerably harder than the average hydrant water of Columbus has been for a number of years past. The water has a faint sulphur odor and tastes distinctly of iron. It will be noticed that the iron content is high and while the water is clear when it is first pumped yet on standing for a few hours it becomes decidedly turbid, then clearing up as the sediment settles to the bottom of the container. The chlorides are higher than the better waters of this section.

The analyses indicate that from a sanitary view this water is usable in its present condition. The objectionable features are the excessive hardness, the presence of iron, and the taste, and these will make the water somewhat unsatisfactory.

EXAMINATION OF WATER FROM DELTA. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
*4227	Feb. 20.....	25	20	slight	earthy	.070	.826	.002	none
*4250	March 22...	25	8	slight	none	.052	.940	.012	none
*4251	March 22...	20	8	very slight	none	.056	.720	.012	none
*4252	March 22...	35	20	slight	none	.062	.900	.016	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4227	1.97	665.0	344	....	....	1476	.....	95	not in 50cc
4250	1.21	594.0	482	none	.1	1513	97	110	not in 50cc
4251	.93	547.0	447	none	.1	1466	72	17	not in 50cc
4252	1.51	678.0	325	none	.2	1466	53	220	not in 50cc

*Preliminary to proposed public supply.

No. 4227. Drilled well at power station. Collected by R. W. Pratt, engineer.

No. 4250. Drilled well at Delta Milling Co. Collected by Mr. W. J. Sherman.

No. 4251. Drilled well at Dumeresk Planing Mill. Collected by Mr. W. J. Sherman.

No. 4252. Drilled well at Toledo and Indiana R. R. Power House. Collected by Mr. W. J. Sherman.

No. 4227. The results indicate that the water would be usable as regards organic pollution, but its inorganic contents are such as to make it unsuited for a public supply. It contains a little iron giving rise to some turbidity, is a very hard water, and contains a large amount of chlorine as chlorides. The salt has come chiefly from mineral sources but is too high for a public supply. With so much mineral matter present the water would be bad for boiler purposes.

Such a water would make a very unsatisfactory public supply and would continually receive criticism.

No. 4,250-4,252. These waters belong to the same class although there are some variations in the various findings. They are all hard waters and contain a very large amount of chlorides. Such waters are not satisfactory for a public supply and do not meet with approval from the consumers, although as regards organic pollution they might be classed as usable.

EXAMINATION OF WATER FROM FREDERICKTOWN. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4332	June 8	10	8	trace	earthy.	.010	.010	trace	none
4376	June 20	tr	none	none	none	.036	.024	.003	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4332	.55	2.3	165	27	.2	284	60	80	not in 50cc
4376	.76	1.0	161	21	.4	244	34	210	not in 50cc

Collected by Mr. Thomas Cureton from test well No. 2.
No. 4376 represents the test well after a period of pumping.

The analyses show an unusual freedom from organic matter and a low degree of hardness for an Ohio ground water. The results indicate a desirable water for a public supply.

FREEPORT, WOOD COUNTY, SEE PRAIRIE DEPOT.

EXAMINATION OF WATER FROM LOVELAND. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4364	June 15	15	20	very slight	earthy	.056	trace	.044	24.0
4688	Oct. 30	10	trace	slight	trace	.006	none	.014	2.4
4689	Oct. 30	10	none	none	none	.006	none	.006	3.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4364	.90	1.7	480.2	147	.4	973	296	150	not in 50cc
4688	.50	12.2	289	39	.5	450	78	200	not in 50cc
4689	.52	12.5	289	48	.5	450	68	350	not in 50cc

No. 4364. Preliminary well No. 1 on island. Collected by Mr. John Trumbleberg.

No. 4688. Drilled well No. 1 of proposed supply. Collected by Mr. J. P. Funderburg.

No. 4689. Drilled well No. 2 of proposed supply. Collected by Mr. J. P. Funderburg.

No. 4364. The bacteriological findings are quite satisfactory as are those chemical findings relating to fresh organic pollution. It will be noticed the sample was very high in nitrites and nitrates and further study in this connection is desirable before a final opinion is offered. The water is a very hard one as shown by the extremely high alkalinity and the high incrustants and the water would therefore be a very undesirable one for steam uses. The total hardness as shown by the present sample is about three times the average of the samples from the Little Miami River above Loveland in the river work of 1900.

No. 4688. By comparison with No. 4364 it is seen that this water is of a very different character and represents water from a different origin. The present sample is similar to the gravel water of the Miami valley and like it shows a low amount of nitrates. It is comparatively free from organic matter and although moderately hard, is otherwise quite acceptable for a public supply.

No. 4,689. This water is of the same general character as the preceding one and will be acceptable for a public supply although somewhat harder than might be desired.

EXAMINATION OF WATER FROM LYNCHBURG. PROPOSED ADDITIONAL SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4198	Jan. 17.....	20	50	slight	earthy	.014	.002	trace	none
4211	Feb. 10.....	20	10	very slight	earthy	.024	.004	trace	none
4212	Feb. 10.....	..	..	.....	.....	....	....	trace	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4198	.28	3.3	286	8	1.5	404	110	1100	not in 50cc
4211	.60	....	....	....	....	.....	.....	36	not in 50cc
4212	.....	....	....	....	....	.....	.....	325	not in 50cc

No. 4,198 and 4,211. Distillery well near sulphur spring. A previous sample (No. 4,182) from this same well was reported upon in January, 1905, as satisfactory except for a high number of bacteria that may have been due to accident. Sample No. 4,198 is almost a duplicate of 4,182 except that it shows considerably more iron and a consequently higher turbidity. If the iron continues to be as high as in 4,198 it will lead to some complaint. Sample No. 4,211 was taken in order to determine the findings for organic matter, and they agree with the former samples. The number of bacteria shows a still further improvement in 4,211 making the water quite satisfactory as regards quality provided the iron remains low.

No. 4,212. This bacterial sample was taken from the inlet to the storage well at the pumping station, and is a mixture of the old and new supplies. By comparing it with No. 4,211, it is seen the new supply is as good as the old one from a bacterial view.

EXAMINATION OF WATER FROM MIAMISBURG. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
3599	April 14 '04	28	60	very slight	trace oily	.082	.068	.024	4.8
3612	May 4, '04	5	none	none	none	.057	.010	none	2.0
3923	Aug. 30, '04	25	trace	trace	none	.026	.112	.150	6.0
4059	Sept. 20, '04	10	none	none	none	.006	.002	.020	none
4077	Sept. 29, '04	10	none	none	peculiar	.012	.072	.120	7.0
4253	Mar. 23, '05	10	none	none	none	.062	.002	.022	2.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
3599	1.38	13.5	247	....	pres.	.....	.....	6400	not in 50cc
3612	.76	8.9	307	31	.25	380	129	14	not in 50cc
3923	1.07	9.7	232	32	trace	402	121	1800	not in 50cc
4059	.29	8.5	226	53	trace	423	179	180	not in 50cc
4077	.51	8.1	220	35	....	388	.....	350	not in 50cc
4253	1.18	8.3	238	....	....	388	.....	350	not in 50cc

No. 3599. Test well on Grove Lot. Collected by Mr. R. W. Pratt, engineer.

No. 3612. Drilled well on Mayo Lot. Collected by Mr. J. G. Jacobs and Dr. W. W. Bookwalter.

No. 3923. Well No. 3 on Zunkel Lot. Collected by Mr. R. W. Pratt, engineer.

No. 4059. Well No. 3 on Zunkel Lot. Collected by Mr. W. S. Bookwalter.

No. 4077. Well No. 2 on Zunkel Lot. Collected by Mr. R. W. Pratt, engineer.

No. 4253. Public Supply. Collected by Mr. R. W. Pratt, engineer.

No. 3,599. The sample was not pleasing in appearance on account of the iron it contained. Intestinal bacteria were not present, but the other findings indicate there is influence from sewage sources. The free ammonia is higher than would be expected, the oxygen required is not as low as it might be and the number of bacteria is high, but the findings that are most significant are those for nitrites, nitrates, and chlorides when considered in connection with the surroundings of the well.

The analysis indicates an undesirable condition of pollution with an incomplete purification.

No. 3,612. The analytical results indicate a deep well water of good quality as regards organic pollution. Nearly all the findings indicative of organic pollution are much lower than those found in the sample collected April 14 from the Grove lot. The present water like those from the Miami watershed is moderately high in alkalinity and will be found to require considerable soap for it is not a soft water, but on the other hand, the amount of scale forming material is relatively low. The water is suitable for a public supply as regards quality.

No. 3,923, 4,059 and 4,077. Some of the findings from No. 3,923 were so unsatisfactory for a proposed supply for a city, (especially the free ammonia, nitrites, nitrates and bacteria), that a second sample was requested. No. 4,059 was received and some remarkable and unusual changes were found. The third sample of this series taken from a well so near the other and only a few days later, again shows the high nitrites, nitrates and ammonia. In view of the proximity of the wells to the edge of the village, the findings mentioned cause one to look upon the future quality of this water with much concern. The present information would indicate a water subject to considerable variation. The results of No. 3,923 and No. 4,059 indicate the possibility of a marked improvement, but on the other hand with such a location, the water on pumping continuously for a public supply may show greater evidences of sewage pollution with less purification. None of the samples showed the presence of intestinal bacteria, and accordingly the use of these waters at the present time would not cause disease, yet, from the variation shown together with the nearness to the edge of the village, this water should receive further tests before a final opinion is passed.

No. 4,253. Proposed supply, already installed, but not yet used. The present sample is, in general, quite like former samples (3,923, 4,059 and 4,077 from the same source.

The sample shows nitrates and chlorides indicative of sewage pollution although somewhat removed in time or distance. Nitrites are present as before and the opinion of the character of the water remains the same, viz.: It is not a desirable water to propose for a public supply on account of the danger of the water becoming more polluted in the future because of the location whence the supply is derived. Since the water at present is free from intestinal bacteria and its use would not lead to disease, it can be called a usable water. This condition should continue as long as the present degree of purification is maintained. Analyses ought to be made at intervals in order to give indication of a failing purification should the tendency be that way.

EXAMINATION OF WATER FROM MT. VERNON, PROPOSED TUBERCULOSIS SANATORIUM. PROPOSED SUPPLY.

PARTS PER MILLION.

	4738	4739	4740
Alkalinity.....	79	59	101
Incrustants	trace	12	7
Total solids	134	106	162
No. of bacteria.....	3500	.....	.....
Colon present	not in 50 cc.	.....	.....

No. 4738. Water from the combined flow of the three springs on the Skeen farm.

No. 4739. Skeen farm, principal spring (walled in).

No. 4740. Skeen farm, southerly spring (undeveloped).

These samples were collected by Mr. R. W. Pratt, Engineer.

The results show that the undeveloped or southerly spring is somewhat harder than the principal spring although it would be called a soft water for an Ohio ground water. Intestinal bacteria were absent from the sample designed for bacterial examination but the number of bacteria is unusually high for a spring of good quality. There is of course, a possibility that the count is accidentally high.

EXAMINATION OF WATER FROM PERRYSBURG. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4590	Sept. 5.....	..	..	.....	.....	.206	.002	.040	trace
4649	Sept. 28....	9	none	mere trace	peculiar	.034	.014	.012	2.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4590	3.75	20.8	204	31	.6	398	79	100,000	yes in 1cc
4649	1.66	21.9	215	39	.1	351	46	10,000	not in 1cc

Collected by Mr. W. J. Sherman, from the dug test well No. 2.

Nos. 4,590 and 4,649. Some of the findings in the first sample were so unsatisfactory that a second sample was requested, taken under better precautions. The results in the later sample represent a ground water of usable character. It will be noticed that this sample was comparatively low in those findings indicative of fresh organic pollution. There is a little indication in the nitrates and chlorides of some past contact of the water with sewage sources, but it is small in amount. The water is only moderately hard for an Ohio ground water. The number of bacteria is rather high, but this would likely be modified when surface washings are better kept out. The analysis indicates a water that should prove under proper protection a suitable water for a public supply.

EXAMINATION OF WATER FROM PRAIRIE DEPOT. PROPOSED SUPPLY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
*4272	March 30 . . .	20	trace	very slight	none	.046	.212	trace	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
*4272	1.21	4.7	233	14	.7	431	75	18	not in 50cc

*Public supply in use two years without approval.

No. 4272. Collected by Mr. R. W. Pratt, engineer, from the public water-works at the pumping station.

The results indicate a ground water that is comparatively free from organic pollution and on that account a desirable water for a public supply. The water is only moderately hard but it contains a small amount of iron which may give rise to minor complaints since it causes a trace of turbidity and sediment on standing. The sample is almost free from bacteria.

The analysis indicates a potable water and one that is doubtless giving satisfaction to the consumers unless there should be complaint about the iron or hardness.

REPORT ON EXAMINATIONS OF WATERS FROM EXISTING PUBLIC WATER SUPPLIES.

WATER SUPPLY OF ASHTABULA.

See report for 1904, page 284.

WATER SUPPLY OF BAINBRIDGE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4333	June 8	20	10	trace	none	.026	.006	trace	10.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4333	.90	22.8	293	128	.2	816	250	375	not in 50cc

Collected from the waterworks well by Mr. Griffith Jones, superintendent. The supply is derived from a large dug well. See Report for 1903, page 62.

The results are in general much the same as those for sample No. 2,901, examined in July, 1903, when this supply was installed without the approval of the State Board of Health.

The results indicate a water which might be called usable but it has several undesirable features for a public supply.

WATER SUPPLY OF BATAVIA.

See Report on an Investigation of the Efficiency of Filtration in Public Water Supplies.

WATER SUPPLY OF BLANCHESTER.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4369	June 19	15	15	very slight	ft. veg.	.306	.030	.024	none
4370	June 19 ....	..	..	.....	fishy	.712	1.176	....	....
4371	June 19 ....	..	..	.....	fishy	.740	1.680	....	....
4372	June 19	15	40	very slight	fishy	.088	.474	.032	none
4380	June 22	20	500	slight	earthy	.416	.050	.004	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4369	3.77	trace	44	2	.5	101	25	30	not in 50cc
4370	6.06	trace	....	....	....	.....	.....	2,100	not in 50cc
4371	7.72	trace	....	....	....	.....	.....	350	not in 50cc
4372	2.29	13.1	171	60	2.8	380	52	450	not in 50cc
4380	8.11	3.5	93	37	con.	457	57	.....	.....

No. 4369. Reservoir. Collected by Mr. R. W. Pratt, engineer.

No. 4370. Reservoir pump. Collected by Mr. R. W. Pratt, engineer.

No. 4371. Reservoir hydrant. Collected by Mr. R. W. Pratt, engineer.

No. 4372. Pump at pumping station. Collected by Mr. R. W. Pratt, engineer.

No. 4380. Dug well No. 1 at pumping station. Collected by Mr. W. B. Chambers.

The supply is derived from impounding reservoirs. See report on Blanchester elsewhere in this volume.

In comparing the findings obtained from the different sources, it will be noticed that there are some strange results. While sample No. 4369 taken from the reservoir near the southerly end indicates a usable water yet the other samples do not make so satisfactory a showing. With the present information at hand it is not clear why samples Nos. 4370 and

4,371 should differ so much from No. 4,369 in organic matter and no more in mineral matter. Again, samples Nos. 4,372 and 4,380 from the pumping station show some strange comparisons. It is not clear why sample 4,372 runs so much higher in chlorides and hardness than the other samples. It would appear from sample No. 4,380 that the odor does not come from dug well No. 1. The water as delivered to the consumers is not a satisfactory water for a public supply as indicated by present samples.

WATER SUPPLY OF BOWLING GREEN.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4282	April 17*...	..	....	.....	.....	....	....	trace	....
4306	May 2.....	10	trace	very slight	trace	.064	.040	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per c.c.	Colon present.
4282	.....	....	....	....	....	.....	.....	180	not in 50cc
4306	1.28	4.1	199	318	.1	827	.....	100	not in 50cc

*Received.

No. 4282. Hydrant at Walters. Collected by Dr. Tobias.

No. 4306. Hydrant at Carpenters. Collected by Mr. E. G. Horton.

The supply is derived from a series of deep wells. See report for 1901, page 434.

The first sample was sent on account of the prevalence of typhoid fever, while the second was collected by the bacteriologist while making an investigation of the typhoid epidemic.

The results show a ground water comparatively free from present or past organic pollution. It will be noticed that the number of bacteria is low and that the water is a desirable one for drinking purposes. Like many of the ground waters of the state, this is a hard water but otherwise quite desirable for a public supply.

WATER SUPPLY OF BROOKVILLE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4762	Dec. 27. ....	..	..	.....	.....	....	....	none	none
4773	Jan. 4, '06..	10	15	slight	trace	.038	.220	.002	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4762	.65	2.4	....	....	....	.....	.....	.18	not in 50cc
4773	.83	2.6	391	none	.6	463	102	.....	.....

The supply is derived from driven wells. See Report for 1903, page 67. A sample was taken by Mr. Paul Hansen, assistant engineer in order to ascertain if the quality had changed since installation. The chemical bottle having been broken in transit, a second sample was collected by Mr. H. E. Coutts, superintendent of waterworks.

Both samples were collected at the pumping station and represented a composite water from the four driven wells. The chemical and bacterial findings agree in showing a ground water that has taken on the characteristics of a deep ground water and is relatively free from fresh or past organic pollution and is, on that account, a desirable water for drinking purposes.

The water contains a little iron making it slightly cloudy and, furthermore, it is quite hard but fortunately, there is in the hardness no incrustants to form a hard scale in boilers. Aside from the iron and hardness, and these objections are minor ones compared with organic pollution, the water would be classed as a very acceptable one for a public supply. The present results are quite similar to those in 1903, except that the iron is somewhat decreased in amount from what it was formerly.

WATER SUPPLY OF BUCYRUS.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4201	Jan. 21...	off high	50	slight	earthy	.278	.284	.008	trace
4202	Jan. 21...	...	...	.....	.....	....	....	....	....

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4201	4.70	1.0	86	42	....	268	.....	3,800	not in 50cc
4202	.....	....	....	....	....	.....	.....	3,500	yes in 50cc

No. 4201. Tap at Dr. Bland's residence.

No. 4202. Ditch entering upper part of waterworks reservoir. Samples collected by Mr. R. W. Pratt, engineer. The supply is obtained from an impounding reservoir. See report under Public Water Supplies and also report for 1900, page 60.

The results show surface waters that contain considerable vegetative organic matter, but without much evidence of sewage pollution. Like sample No. 1,582 (examined in February, 1901) the present sample from the reservoir is an unsatisfactory water for a public supply on account of its appearance, suspended matter and vegetative matter. The use of such a water in an untreated state cannot be satisfactory to the consumers of a city, and there must be times when the conditions are even worse.

WATER SUPPLY OF CAMBRIDGE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4753	Dec. 21.....	..	550	consid.	earthy	.296	.010	trace	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4753	5.74	12.7	88	30	5.0	453	50	.....	yes in 1cc

The supply was formerly derived from Wills Creek, later from large dug wells, and still later the creek was again used. See Report for 1899, page 707. This sample was collected by Mr. Paul Hansen, assistant engineer, from a tap in the National Hotel.

The results are in general similar to those obtained from Wills Creek near the waterworks intake in the river examination of 1899. These findings show a surface water containing considerable vegetative organic matter, a slight amount of sewage material and much suspended matter. From previous analyses this is such a water as may be expected from Wills Creek at any time, although there are seasons when it is much worse. It is a water that is wholly unfit for a public supply in its present untreated condition.

WATER SUPPLY OF CARROLLTON.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4722	Nov. 16	15	225	distinct	peculiar	.650	.010	.006	none
4746	Dec. 6	15	60	distinct	faint	.034	.214	.005	trace
4747	Dec. 6	15	none	none	peculiar	.028	.214	.002	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4722	9.14	6.2	180	none	22.5	509	70	40	not in 50cc
4746	.76	4.0	181	none	4.8	301	30	2,200	not in 50cc
4747	.61	1.3	172	none	.45	259	22	3	not in 50cc

No. 4722. Hydrant. Collected by Dr. A. H. Hise.

No. 4746. Wells Nos. 1 and 2 combined. Collected by Mr. R. W. Pratt.

No. 4747. Well No. 3. Collected by Mr. R. W. Pratt.

The supply is derived from drilled wells. See Report under Public Water Supplies.

No. 4722. This analysis was requested because of the bad appearance of the water of the public supply which had previously been of good appearance.

It will be noticed that the bacteriological findings are quite satisfactory but, on the other hand, the chemical findings are quite unsatisfactory and are not in accord with previous samples from this source. In the chemical findings there is a marked increase in the evidences of impurity over previous analyses and this shows that further examinations should be made and in the meantime the water should be looked upon with some suspicion. Later, a specimen of rock from this water bearing formation was examined to see if it contained sufficient organic matter to account for the high albuminoid ammonia. It was found to be able to account for but 1-20 of the amount shown.

No. 4747. Well No. 3. The analysis of this sample indicates a water in general character, quite similar to the samples examined in

August, 1895, and November, 1904. (See No. 4,136.) It is a good water and suitable for a public supply.

No. 4,746. Wells No. 1 and No. 2 combined. The analysis shows a water in general character somewhat like the preceding but in addition it shows an increase in chlorides, iron, suspended matter and the number of bacteria. While these are undesirable additions to the water, yet, they cannot be said in this case, to be dangerous ones, since intestinal bacteria were not found. The iron will be displeasing and the suspended matter of inorganic nature would not be considered a good addition on account of its action on the intestinal tract, provided it were present to any extent. The greatest objection would be on account of the appearance of the water. It will be noticed that the present sample contains very little suspended matter and practically no organic matter in suspension. In fact, the total organic matter as shown by the chemical analysis is low. This water would be classed as somewhat undesirable on account of the suspended matter and the number of bacteria, but nevertheless, it can be used.

It would appear that in drawing from the wells a fresh pocket had been opened up that yielded a turbid water richer in organic matter, and which has now largely cleared up.

WATER SUPPLY OF COLUMBUS.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4230	Feb. 24. . . .	30	25	very slight	earthy	.352	.160	.008	off. none
4254	March 27. . .	35	15	slight	faint	.128	.004	.008	2.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4230	9.70	7.1	145	....	....	694	.....	100,000	yes in 50cc
4254	3.11	7.9	191	....	trace	522	46	600	not in 50cc

BACTERIOLOGICAL EXAMINATIONS OF COLUMBUS WATER. FROM FAUCET
IN THE STATE HOUSE.

Sample number.	Day of collection.	Hour.	Appearance.	Number of bacteria.	Colon present.
4196	Jan. 11.....	9:15 a.m.	Nearly clear.....	8,400	not in 50cc
4199	Jan. 19.....	3:00 p.m.	Nearly clear.....	2,800	yes in 1cc
4213	Feb. 11.....	11:45 a.m.	Nearly clear.....	1,300	not in 50cc
4214	Feb. 13.....	1:30 p.m.	Nearly clear.....	3,800	yes in 1cc
4215	Feb. 14.....	1:45 p.m.	Clear.....	1,700	yes in 1cc
4216	Feb. 15.....	2:30 p.m.	Clear.....	1,200	not in 50cc
4221	Feb. 16.....	2:30 p.m.	Clear.....	1,000	not in 50cc
4223	Feb. 17.....	3:45 p.m.	Clear.....	350	not in 50cc
4224	Feb. 18.....	1:00 p.m.	Clear.....	400	not in 50cc
4225	Feb. 20.....	1:00 p.m.	Cloudy.....	225	yes in 1cc
4228	Feb. 21.....	4:00 p.m.	Clear.....	1,000	yes in 1cc
4229	Feb. 23.....	4:15 p.m.	Slightly muddy.....	50,000	yes in 1cc
*4230	Feb. 24.....	12:30 p.m.	Slightly muddy.....	100,000	yes in 1cc
4232	Feb. 25.....	9:00 a.m.	Nearly clear.....	140,000	not in 50cc
4233	Feb. 27.....	10:00 a.m.	Cloudy.....	23,000	yes in 1cc
4234	Feb. 28.....	2:30 p.m.	Cloudy.....	75,000	not in 50cc
4235	March 2.....	2:30 p.m.	Roily.....	21,000	yes in 1cc
4237	March 6.....	3:00 p.m.	Nearly clear.....	2,200	not in 50cc
4238	March 8.....	3:00 p.m.	Cloudy.....	15,000	not in 50cc
4239	March 10.....	.....	.....	15,000	yes in 1cc
4241	March 14.....	.....	.....	650	yes in 1cc
4243	March 15.....	.....	.....	1,200	yes in 50cc
4244	March 16.....	.....	.....	650	not in 1cc
4246	March 17.....	.....	.....	500	not in 50cc
4247	March 21.....	.....	.....	4,500	yes in 1cc
*4254	March 27.....	1:20 p.m.	Cloudy.....	600	not in 1cc
4276	April 7.....	3:30 p.m.	Very muddy.....	150	yes in 50cc
Average.....				17,467	

*Chemical.

The supply is derived from various wells, filter basins, filter galleries, Scioto River, and Alum Creek. See report for 1898, page 578.

The analyses like those of previous years show a usable water at times with other periods showing pollutions varying in amount from slight to serious. The supply is an unsafe one.

WATER SUPPLY OF OHIO INSTITUTION FOR THE EDUCATION OF THE DEAF AND DUMB, COLUMBUS.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4236	March 6....	20	trace	none	faint	.026	.050	.002	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4236	.44	27.0	....	....	....	.....	.....	28	not in 50cc

The supply is from a dug and drilled well, and an analysis was requested because of the presence of typhoid fever at the institution.

The results are much the same as in sample No. 3,481, examined in February, 1904. The findings for several determinations show an improvement over the condition a year ago. The water is a potable one at this time.

WATER SUPPLY OF COLUMBUS STATE HOSPITAL.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4744	Dec. 4.....	9	none	none	none	.018	.080	.010	none
4745	Dec. 4.....	8	none	none	trace	.026	none	none	6.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4744	.53	14.5	304	....	....	792	.....	14	not in 50cc
4745	.52	8.0	282	....	....	510	.....	17	not in 50cc

No. 4744. Driven wells for laundry water. Collected by Dr. E. E. Gaver.

No. 4745. Avenue driven wells for drinking water. Collected by Dr. E. E. Gaver. Analyses were requested on account of the presence of typhoid in the institution.

No. 4,744. "No. 1 Driven wells. Source of laundry water." The chemical analysis supported by the very satisfactory bacteriological findings indicates that this water at the time of sampling was not the cause of typhoid fever.

No. 4,745. "No. 2 Avenue driven wells. Water used for drinking purposes." The very low findings for those chemical determinations indicative of fresh organic pollution supported by the very satisfactory bacteriological results show that this water at the time of sampling was a potable one and there is no analytical reason for thinking this water could have caused typhoid fever.

WATER SUPPLY OF COVINGTON.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4768	Dec. 29,	10	trace	very slight	none	....	....	trace	none
4781	Jan. 10, '06..	15	none	none	trace	.034	.012	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4768	1.39	7.3	224	....	....	.....	.....	.....	.....
4781	1.45	8.3	248	26	.7	368	60	10	not in 50cc

The supply is obtained from a series of driven wells. See Report for 1904, page 68. Collected from a tap at the pumping station by Mr. Paul Hansen, assistant engineer.

No. 4,768. The most of the sample was spilled in transportation. The results as far as obtained, indicate a suitable water for a public supply but a comparison with the findings on sample No. 4,066, examined in September, 1904, show an increase in oxygen required and chlorides. This is not desirable and suggests the advisability of a more complete analysis in the near future.

No. 4,781. The results show a ground water that is practically free from bacteria, and from evidences of fresh or past organic pollution and it is therefore, suitable for drinking purposes. This water is only moderately hard, being softer than many of the Ohio ground waters, but contains a small amount of iron. Comparing this sample with No. 4,066 examined as a proposed supply in September, 1904 and No. 4,768 obtained from this supply last month, we find that the chlorides are increasing as the determination in No. 4,066 was 1.9 parts per million, in No. 4,768 was 7.3 and in 4,781 was 8.3. The remainder of the analysis fails as yet to indicate the probability of this factor being increased from a sewage source. The inspection of the location and vicinity may be able to throw some light on this phase of the analysis.

The amount of iron has slightly decreased from that found in the sample proposed for the supply a little over a year ago. The water is a trifle harder than it was at that time and now shows a small amount of scale forming material. (See incrustants.) The analysis indicates a potable water and one which should in general prove satisfactory to the consumers.

WATER SUPPLY OF DEFIANCE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4743	Dec. 1.	35	2,000	considerable	faint	.472	.018	trace	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4743	17.20	8.8	98	38	10	914	.....	72,500	yes in 1cc

The supply is derived from the Maumee River. The sample was collected by Dr. J. D. Westrick, H. O., and the analysis requested because of complaints concerning the quality of the water.

The results indicate a surface water showing much iron, suspended matter, organic matter and the evidence of intestinal pollution. The number of bacteria is high and colon bacilli were present in 1 cubic centimeter portions of the sample. The amount of suspended matter is very high. The results when compared with findings in the analyses made in 1903 would indicate that the present sample was obtained at a time when the stream was rather high, that is, subject to some rain influences.

The results agree with those of former analyses in indicating a water that is not good nor wholesome, nor fit for use as a public water supply.

WATER SUPPLY OF DELAWARE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4672	Oct. 16	20	trace	very slight	ft. veg.	.152	.012	none	none
4673	Oct. 16	35	10 iron	slight	ft. earthy	.022	.170	none	none
4674	Oct. 16	25	trace	very slight	ft. earthy	.078	.098	trace	none
4675	Oct. 16	30	trace	very slight	ft. earthy	.110	.002	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4672	4.01	3.9	213	68	.5	380	43	4,600	not in 50cc
4673	1.03	2.9	400	200	3.2	858	96	13	not in 50cc
4674	2.46	2.7	299	132	1.6	600	61	280	not in 50cc
4675	3.50	3.3	229	71	.8	413	47	500	not in 50cc

No. 4672. Olentangy River.

No. 4673. Deep well No. 2.

Nos. 4674 and 4675. Taps at pumping station and at office of Dr. Bonner.

The samples were collected by Mr. R. W. Pratt on account of the presence of typhoid fever at Delaware. The supply is derived from a dug well, a drilled well, a filter gallery, and an emergency intake connecting with Olentangy River.

No. 4672. Olentangy River. The results compared with former analyses of samples from this river at Delaware show the present sample was taken when the water was in a better condition than the average. However, the analysis shows a water receiving so much pollution that it cannot be considered suitable in the untreated state for an addition to the public supply.

No. 4673. Deep well No. 2. The results indicate a ground water practically free from chemical evidences of organic pollution and the water is also nearly free from bacteria of any kind. It is a much harder water than the river water and also contains considerable iron. Aside from the objections to the hardness and iron (minor objections when compared with the features which directly involve health) it is a suitable water for a public supply.

Nos. 4,674 and 4,675. Tap at pumping station and tap at office of Dr. Bonner. These samples, representing the water as it is pumped to the consumers, occupy an intermediate position between the two preceding samples. This is not necessarily to be taken as indicating that river water had been added to the supply by means of a direct emergency intake although such a proceeding would have given a similar result. But, on the other hand, it may be taken as meaning that the water from the filter gallery partakes more of the nature of the river water as regards organic matter and hardness than it does of the ground water from the deep wells. In other words, the filter gallery water is only partially filtered. The results of analyses 4,673-4,675 indicate that the water as used at the time of sampling would not have caused typhoid fever.

WATER SUPPLY OF FOSTORIA.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4588	Sept. 4	20	trace	trace	trace	.192	.012	trace	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4588	4.08	3.6	123	....	....	299	48	835	not in 50cc

The supply is obtained from Portage Creek and wells. See Report for 1898, page 529. The sample was collected by Mr. William Caldwell, H. O.; the analysis having been requested in order to ascertain the quality of the supply when at a low stage.

The results indicate a surface water free from sewage pollution, although containing some vegetative organic matter. The water is somewhat harder than it was when examined in August, 1904. The findings indicate a usable water for a public supply.

WATER SUPPLY OF GREENVILLE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4764	Dec. 28.	tr	30	distinct	none	.020	.200	.002	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4764	.47	3.7	331	46	1.5	480	65	15	not in 50cc

The supply is derived from drilled wells. See Report for 1900, page 552. This sample was collected by Mr. Paul Hansen, at the pumping station and represented the composite supply of 15 wells.

The analysis shows a ground water of good quality as regards its freedom from organic pollution. The number of bacteria was very low, intestinal bacteria were absent and chemically there was no evidence of organic pollution. The water is hard and shows incrustants the latter of which has not been the case in former samples. The water contains considerable iron causing it to be objectionable in appearance and in its staining qualities. Aside from the minor change in regard to the kind of hardness, the present sample is very much like former samples from this source, namely, No. 361, No. 362, and No. 810, examined in March and October, 1899. The analysis indicates the water is practically the same as it was six years ago, namely, a usable water open only to the objection that it is hard and contains iron, the latter causing the displeasing appearance. Without these objections it would readily be classed as potable.

WATER SUPPLY OF HILLSBORO.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4643	Sept. 25	9	10	slight	none	.046	.004	.006	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4643	1.18	3.1	267	16	2.0	370	55	110	not in 50cc

The supply is derived from drilled wells. See Report for 1898, page 566. The sample was collected by Dr. J. D. McBride.

The results indicate a ground water relatively free from organic pollution, past or present. The analysis is quite similar to previous ones from this source and indicates the water is a suitable one for a public water supply. The only objection that would be raised to this water is in reference to the iron which it contains. This is not a harmful factor as regards health, but is undesirable.

WATER SUPPLY OF JACKSON.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4409	July 3.	20	70	very slight	none	.062	.024	none	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4409	1.36	23.5	148	18	2.8	346	36	250	not in 50cc

The supply is obtained from drilled wells. See Report for 1901, page 446. The sample was collected by Mr. C. W. Finney, clerk.

The results indicate a ground water comparatively free from organic pollution and not a hard water as the ground waters of Ohio run. It is a little softer than the sample submitted for the proposed supply in 1899, the chlorides are somewhat higher while the iron shows a decrease but is still considerably in evidence, and doubtless, causes some complaint from consumers on account of the turbidity and sediment it produces in the water. Barring the minor objection due to the iron this is a suitable water for a public supply.

WATER SUPPLY OF LANCASTER.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4217	Feb. 15.	25	20	slight	faint	.016	.036	.002	none
4218	Feb. 15.	15	none	none	faint	.020	.016	trace	2.0
4220	Feb. 15.	20	10	trace	faint	.014	.014	.002	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4217	.45	3.4	278	....	....	405	.....	none	not in 50cc
4218	.83	36.3	271	....	....	359	.....	27	not in 50cc
4220	.56	3.2	306	....	....	416	.....	25	not in 50cc

These samples were collected by Dr. G. W. O'Grady and an examination requested on account of quality. The present supply is obtained from driven wells. The former supply was obtained from a filter gallery and well. See Report for 1902, page 83, also Report for 1898, page 568.

No. 4,217. Wells at west side pumping station. Present supply. The results show a usable water for a public supply.

No. 4,218. Filter gallery and open well at old pumping station. Former supply occasionally used. While the results indicate this water might perhaps be used at the time of sampling, yet the nitrates and chlorides show a marked influence from polluting sources and in a location where pollution could occur would place the water in the suspicious class on account of its liability to pollution at other times.

No. 4,220. Hydrant in city hall. This water is quite like that from the west side wells, the analytical differences being minor considerations in this connection.

WATER SUPPLY OF LEBANON.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4411	July 5.....	10	10	trace	none	.016	.134	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4411	.60	13.7	286	20	.9	402	62	6	not in 50cc

Collected by Mr. S. N. Williams, Clerk of trustees of public affairs. The supply is obtained from a series of driven wells. See Report for 1900, page 553.

The results indicate a ground water of good quality and one that should give satisfaction to the consumers. It contains a little iron but shows much improvement in that respect over the sample received in

September, 1902. The present sample also shows a decrease in organic matter from the previous sample, although it is a little harder. It is a potable water.

WATER SUPPLY OF LEETONIA.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4690	Oct. 30...	trace	none	none	none	....	....	none	....
4749	Dec. 16...	5	none	none	none	.016	trace	.010	none
4751	Dec. 16...	none	none	none	none	.008	none	trace	2.0
4752	Dec. 16...	none	none	none	none	.006	.082	.002	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4690	1.60	1.7	....	....	....	.....	.....	185	not in 50cc
4749	.98	2.3	168	38	.4	267	28	500	yes in 50cc
4751	.20	3.0	107	18	.2	177	25	21	not in 50cc
4752	.65	1.9	189	23	.3	268	30	375	yes in 50cc

No. 4690. General water supply.

No. 4749. Emergency supply from a small stream.

No. 4751. Springs. Present public supply.

No. 4752. Tap in drug store.

The first sample was collected by Dr. S. R. McCready, health officer, while the others were collected by Mr. Paul Hansen, assistant engineer.

The supply is obtained from springs and drilled wells with an emergency intake. See Report for 1901, page 448.

No. 4690. General water supply. Chemical bottle broken in transit. These results indicate a suitable water for a public supply and are in general like those of a previous sample from this place in October, 1900.

No. 4749. Emergency supply. While the analysis indicates that the sample was taken at a time when there was only a small amount of pollution, yet there is evidence of a slight sewage influence. Intestinal bac-

teria were present as might be expected since the stream passes through a barn yard. While the presence of intestinal bacteria from such a source may have a different significance than intestinal bacteria from human sewage, yet the conditions are such that this water is not to be looked upon as desirable for addition to a good public supply.

No. 4,751. Present public supply: The bacteriological and chemical findings indicate a comparatively soft water and one that is free from fresh organic pollution. The nitrates and chlorides show a small amount of past sewage influence such as might come from a near by privy vault.

No. 4,752. Present supply. These results differ in some respects from the preceding sample and indicate the influence of water from some other source than that represented by sample No. 4,751. The number of bacteria and the presence of intestinal bacteria together with some of the chemical findings would suggest the possibility of some influence from a previous use of the emergency supply and this influence could result through a reservoir some time after the emergency supply had been cut off. While the presence of intestinal bacteria is an undesirable feature, yet, in view of the probability that these intestinal bacteria came from animal rather than human sewage, it would seem that the water is not as bad as the presence of intestinal bacteria ordinarily indicates. With the other findings as satisfactory as shown by the analysis and with the probable source of the intestinal bacteria now cut off, it would seem that this water is to be classed as a usable one. With the source of intestinal bacteria excluded this water should prove a satisfactory one.

WATER SUPPLY OF LOGAN.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4615	Sept. 13	10	none	none	none	.022	.112	trace	none
4616	Sept. 13	10	trace	slight	trace	.044	.008	.002	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4615	.57	27.4	239	23	.5	374	.....	8	not in 50cc
4616	.95	9.5	212	23	.5	297	37	75	not in 50cc

The supply is derived from two dug wells. See Report for 1901, page 451. An examination was requested in order to ascertain the quality, and samples were collected by Mr. George Gladman, superintendent.

No. 4,615. No. 1 dug well. The analysis indicates a ground water of suitable purity for use as a public supply. The water is moderately hard but does not contain a large amount of scale forming material. The ammonias are lower than when the well was examined in 1895 but the chlorides have increased.

No. 4,616. No. 2 dug well. The results indicate a ground water that is a little softer than the preceding and considerably lower in chlorides and is also of good bacterial character. It is a suitable water for a public supply. The increase in chlorides in this well over the examination of 1895 is not near so great as that in the preceding sample.

WATER SUPPLY OF LONDON.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4360	June 12.	20	15	trace	trace	.018	.590	.008	trace
4361	June 12.	15	15	trace	trace	.018	.078	.086	trace

Sample number.	Oxygen required.	Chlorine.	Alkalin-ity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on igni-tion.	No. per cc.	Colon present.
4360	1.88	3.2	366	none	.5	448	54	3,500	not in 50cc
4361	1.72	3.3	354	none	.5	456	56	50	not in 50cc

No. 4360. From the receiving well at the mouth of the inlet pipe. Rep-resented water from the wells.

No. 4361. Hydrant.

The samples were collected by Dr. W. H. Christopher, H. O., at the request of the State Board of Health.

The variations between the two samples due to their places of collec-tion are of minor importance. The results indicate a ground water of good quality as regards freedom from organic pollution. (The number of bacteria in one of the samples, 4,360, appears to have been due to an accidental contamination.) The water is hard but fortunately does not contain those substances forming a hard scale in boilers. The water con-tains a little iron, making it somewhat displeasing in appearance. The analysis shows a suitable water for a public supply barring a slight ob-jection to its hardness and the presence of some iron.

WATER SUPPLY OF LOUDONVILLE.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4625	Sept. 18....	trace	none	none	none	.006	none	.004	trace

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4625	.67	8.7	243	22	....	329	40	150	not in 50cc

The supply is derived from drilled wells. See Report for 1902, page 85. The sample was collected from the public supply by Mr. Walter S. Young, health officer, on account of the presence of typhoid fever.

The results indicate a ground water of good quality and practically free from organic matter of either vegetative or animal origin. This water is softer than the sample proposed for a public supply in 1902, and is only a moderately hard one as Ohio ground waters run. It is a suitable water for a public supply and doubtless is giving satisfaction.

WATER SUPPLY OF MINERVA.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4586	Sept. 4	10	none	none	none	.012	.010	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4586	.43	2.2	165	....	....	235	24	80	not in 50cc

The supply is derived from drilled wells. See Reports for 1899, page 701, and 1904, page 263.

On account of the presence of typhoid fever, this sample was collected by Dr. A. Thomas, health officer, from the public supply on Elizabeth Street.

The results indicate a ground water of good quality without evidence of sewage pollution and therefore satisfactory for a public supply. There is no reason for believing that the use of this water has had anything to do with causing typhoid fever. The examination shows that the water belongs in the same class as when examined in May, 1904.

WATER SUPPLY OF MT. STERLING.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4614	Sept. 13 . . .	13	10	distinct	trace	.070	.950	.002	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4614	1.02	3.9	363	39	.9	594	52	3	not in 50cc

The supply is derived from a drilled well. See Report for 1901, page 454.

This sample was collected by Dr. C. T. Gallagher, from the city supply, examination having been requested by the local board of health in order to ascertain the quality.

The findings are those of a deep ground water and are quite satisfactory for a public supply so far as freedom from organic pollution is concerned, but the water contains a little iron and becomes cloudy on that account. This is not a serious objection but is displeasing to some. The water is moderately hard but contains only a small amount of incrusting material. The water varies but little from an examination made by Professor C. C. Howard in 1896.

WATER SUPPLY OF NOTTINGHAM.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4481	Aug. 5	5	none	trace	none	.034	.028	trace	....

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4481	2.18	10.7	107	32	....	208	.....	275	yes in 1cc

The supply is derived from the Lake. See report under Public Water Supplies elsewhere in this volume. Sample collected by Mr. R. W. Pratt, engineer.

No. 4481. Hydrant water from tap at the E. G. Tame cottage, Beachland.

The results indicate a lake water modified by the presence of organic material from some polluting source. The chlorides are too high for a normal lake water and intestinal bacteria were present in 1 cc. and 50 cc. portions of the sample, thus indicating sewage influence. Such a water, although not grossly polluted at this time, can not be considered a safe one since it shows the evidence of sewage pollution.

WATER SUPPLY OF PLYMOUTH.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4323	June 2 .....	..	40	slight	vegetative	.326	.030	....	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4323	5.44	9.0	190	....	....	.....	.....	750	yes in 1cc

The supply is derived from drilled wells and Huron River. See Reports for 1901, page 68, and 1902, page 481.

This sample was collected by Mr. George J. Searle from Huron River at the intake of the waterworks. After a portion of the determinations from this sample had been made, the analysis was stopped pending the arrival of a subsequent sample which did not come.

The results show the presence of intestinal bacteria and so much organic matter as to make the water unsuited for a public supply.

WATER SUPPLY OF PORT CLINTON.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4463	July 19.....	10	10	very slight	vegetative	.138	.010	.002	none
4464	July 19.....	8	15	very slight	vegetative	.182	.020	.002	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4463	2.73	15.9	96	121	....	175	.....	1,300	yes in 1cc
4464	2.84	16.3	96	21	....	182	.....	300	yes in 1cc

The supply is obtained from Lake Erie. See Report for 1898, page 554. These samples were collected by Dr. H. J. Pool, health officer, to be examined with reference to local pollution from the river.

The results of the two samples at this time are quite similar, indicating that the water at the two places was practically the same. The presence of intestinal bacteria together with some of the chemical findings indicate sufficient pollution to class the water as unsuitable for a public supply. The high amount of chlorides found in some previous samples from this locality are absent in the present samples. (See samples 4,094 and 4,095 taken in October, 1904.)

WATER SUPPLY OF SALEM.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4316	May 21.....	tr	trace	trace	trace	.058	.014	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4316	.75	2.5	237	trace	trace	318	.....	750	not in 50cc

The supply is from drilled wells. See Reports for 1901, page 461, and 1903, page 89.

This sample was collected from the public supply by Dr. E. J. Schwartz, health officer.

The results indicate a potable water for a public supply and one that should give satisfaction to the consumers.

WATER SUPPLY OF SPRINGFIELD.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia	Nitrites.	Nitrates.
4433	July 11.....	20	30	distinct	vegetative	.114	.008	none	1.4
4434	July 11.....	tr	tr.	trace	none	.020	.006	none	1.4

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4433	3.68	trace	255	34	.8	460	57	2,100	yes in 1cc
4434	.88	.5	263	91	trace	455	51	1,200	not in 50cc

The supply is derived from well, filter galley, filter basin and Buck Creek. See Report for 1900, pages 101 and 538, and Report for 1902, page 253. The samples were collected by the waterworks engineer.

No. 4433. Buck Creek at waterworks station. The results show considerable vegetative matter and intestinal bacteria were present at this time. The results are slightly inferior to the average obtained at this point in previous samples. The water could hardly be classed as suitable for a public supply without treatment.

No. 4434. Pump well. This water represents the public supply of Springfield. The findings indicate a suitable water for a public supply with the exception that the water is rather hard,

WATER SUPPLY OF TIPPECANOE CITY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4545	Aug. 24 ....	..	none	none	none	.040	.024	none	.4

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4545	.99	6.1	239	33	.5	348	68	23	not in 50cc

The supply is derived from driven wells. See Report for 1900, page 559. Examination was requested on account of quality, and the sample was collected by Mr. C. J. Diehl, clerk of trustees of public affairs.

The sample represented the public supply as delivered to the consumers. The analysis indicates a ground water of good quality as regards freedom from organic matter, and is even an improvement over a former analysis by this Board. The water is rather hard but not as hard as many waters now in use in the State. Aside from the hardness the water is a very good one and will give satisfaction to the consumers.

WATER SUPPLY OF UPPER SANDUSKY.

See Report on an Investigation of the Efficiency of Filtration in Public Water Supplies.

WATER SUPPLY OF VAN WERT.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4329	June 7	20	10	very slight	none	.010	.350	trace	none
4330	June 7	10	none	none	sour. veg	.324	.012	none	none
4331	June 7	25	20iron	slight	faint	.024	.360	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4329	1.13	25.6	153	357	1.4	1,600	284	10	not in 50cc
4330	2.53	26.4	79	348	.6	1,634	320	500	not in 50cc
4331	1.08	24.7	149	358	2.0	1,626	302	none	not in 50cc

The supply is derived from drilled wells. See Report for 1898, page 487, and Report for 1904, page 276.

These samples were collected by Dr. C. G. Church at the request of the State Board of Health in order that a full examination might be made of the supply.

No. 4329. Pump at the waterworks station representing the water as it comes from the well.

No. 4330. From the reservoir.

No. 4331. From a hydrant in the city.

The minor fluctuations in the various samples need no particular comment other than to say that the reservoir sample shows some increase in vegetative matter and a decrease in iron as might be expected.

The regular supply is comparatively free from organic matter either of sewage or vegetative origin. The water is an unusually hard one and it will be noticed that the material forming scale in boilers is extremely high. This makes a very objectionable water for steam and laundry purposes. The iron is another objectionable feature, although not harmful to health.

The analyses show a suitable water for a public supply as regards freedom from organic pollution but it is objectionable on account of iron and hardness.

WATER SUPPLY OF VERMILLION.

See Report on an Investigation of the Efficiency of Filtration in Public Water Supplies.

WATER SUPPLY OF WEST MANCHESTER.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4761	Dec. 27...	none	20	distinct	none	.022	.570	.004	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4761	.52	2.6	297	10	2.7	475	73	140	not in 50cc

The supply is obtained from a driven well. See Report for 1903, page 118. This sample was collected from a tap at the pumping station by Mr. Paul Hansen, assistant engineer.

The results indicate a ground water comparatively free from fresh or past organic pollution. It will be noticed the chlorides are quite low. The water did not contain intestinal bacteria and was low in total number of bacteria. The water is moderately hard as shown by the alkalinity but is nearly free from those substances that form a hard scale. By comparison with the results from sample No. 3,229 proposed as a supply in November, 1903, we find that the present sample shows an improvement in several of the determinations. The present findings bear out the report made in November, 1903, in indicating a usable water that would be classed as very acceptable if it were free from iron and not so hard. It will be noticed that the iron is greater now than formerly. This is undesirable. The scale forming material is so low that it would pass unnoticed and the total hardness is less than it was two years ago.

Although the total hardness is less objectionable than it was two years ago, yet the iron has increased and will lead to some complaint if it continues to increase. Aside from these minor objections the water is a good one and should prove satisfactory from the standpoint of health.

WATER SUPPLY OF WOODSFIELD.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4540	Aug. 21 . . .	34	40	decided	vegetative	.180	.142	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4540	3.18	19.0	48	20	2.7	146	31	850	yes in 1cc

The supply is obtained from an impounding reservoir on Whittenbrook Run. See Report for 1901, page 75, and Report for 1904, page 280. This sample was collected from a hydrant by Dr. J. Way, on account of the presence of typhoid fever.

The analysis shows the presence of considerable organic matter and in this respect the present sample shows much higher findings than the one examined in March, 1904. (See No. 3,579.) The chlorides are also much higher than they were at that time. Part of the difference in the chlorine findings is no doubt due to the fact that the 1904 sample was taken after a very heavy rain. The iron in the present sample is much higher than the one examined last year. In addition the present sample shows the presence of intestinal bacteria. These intestinal bacteria may have come from animals upon the watershed of the stream furnishing the supply and if that be the case, their presence is not so significant as if they came from human sewage. On the whole, the water is much inferior to what it was in March, 1904, and it has several undesirable findings.

Since this water is derived from a stream and surface waters are subject to considerable variation, it may be that the undesirable findings shown above are but passing ones and possibly do not hold for any length of time, but if they are constant factors then the water is not a suitable one for a public supply without purification.

WATER SUPPLY OF OHIO SOLDIERS' AND SAILORS' ORPHANS' HOME,
XENIA.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4301	May 1.....	10	none	none	sour mouldy	.044	.020	.002	4.0
4302	May 1.....	10	none	trace	sour mouldy	.176	.036	trace	2.0

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4301	.90	6.5	319	21	....	463	.....	131,000	not in 50cc
4302	1.52	5.2	225	....	.5	299	.....	250,000	not in 50cc

The supply is derived from deep wells and analyses were requested on account of quality and the influence of the ice used. The collections were made by Dr. W. C. Hewitt.

No. 4,301. Well water without ice. The chemical analysis shows this water is comparatively free from fresh organic matter. The nitrates and chlorides indicate a small amount of past pollution although purification has been maintained so that this pollution is not at present a source of danger. Of course, the analysis does not reveal the source of this polluting agency. The number of bacteria is so very high as to be out of proportion with the chemical analysis and is presumably due to an accidental contamination. It will be noticed that intestinal bacteria are absent.

No. 4,302. Well water with ice. It will be noticed that the findings for organic matter are noticeably increased. Some of the mineral

findings are decreased as would naturally be expected from the addition of the ice, since these mineral constituents are eliminated in the process of freezing. This water is much less desirable for drinking purposes than the water without the ice as shown by the preceding sample. Intestinal bacteria are also absent in this sample, hence there is no danger of specific disease.

REPORT ON AN INVESTIGATION OF THE EFFICIENCY OF FILTRATION IN PUBLIC WATER SUPPLIES.

For a number of years the Board has made occasional brief tests of the bacterial efficiencies of some of the water purification plants in Ohio. While sufficient funds have not yet been at our disposal to carry out the work as thoroughly as should be done, yet much benefit has been derived from the few brief examinations that have been made.

The plan has been for the bacteriologist to visit those cities and villages having purification plants and run a test usually covering at least parts of two days. The date of investigation was not known to the local authorities until the test was on, with the result that the early part of the test showed the usual conditions of operation and generally no change in operation occurred except by request. In several cases the Board has been able to point out defects and the operators have thus been able to improve their service and furnish the citizens with a water of improved quality. In some cases the investigations have given the citizens assurance of the efficiency of their local purification plant.

Press of other work has limited the number of examinations during the present year.

WATER SUPPLY OF BATAVIA.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4557	Aug. 28	12	none	mere trace	trace	.106	.012	none	none
4567	Aug. 28	30	350	decided	veg. & e'thy	.274	.030	.002	none
4576	Aug. 28	10	none	none	trace	.100	.014	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4557	2.02	1.9	68	38	....	173	36	220	not in 50cc
4567	5.58	.9	109	24	....	279	33	1,050	yes in 1cc
4576	2.25	1.6	76	41	....	175	31	130	not in 50cc

No. 4557. Hydrant representing reservoir water.

No. 4567. East Branch of Little Miami River, unfiltered.

No. 4576. Filter effluent.

The supply is derived from the East Fork of the Little Miami River, pumped to two sedimentation basins with the addition of alum as a coagulant, run to the filter by gravity, passed through a We-fu-go filter, and the filtered water pumped from the clear well to the reservoir. See Report for 1900, page 547, and Report for 1904, page 300.

EAST FORK OF LITTLE MIAMI RIVER.

Sample number.	Date.	Alkalinity.	Incrustants.	Bacteria per cc.	Colon present in 50cc.
UNFILTERED.					
4561	Aug. 28, 1905, 1:00 p.m.....	109	...	2,800	yes in 1cc
4564	Aug. 28, 1905, 2:15 p.m.....	...	...	3,000	.....
4566	Aug. 28, 1905, 2:45 p.m.....	...	...	1,400	.....
4567	Aug. 28, 1905, 3:10 p.m.....	109	24	1,050	yes in 1cc
4570	Aug. 28, 1905, 3:50 p.m.....	...	...	2,650	.....
4574	Aug. 28, 1905, 4:45 p.m.....	110	...	4,800	yes in 1cc
	Average	109.3	24	2,616	
TREATED AND SEDIMENTED, BUT NOT FILTERED.					
4573	Aug. 28, 1905, 4:35 p.m.....	...	...	500	.....
4575	Aug. 28, 1905, 5:15 p.m.....	...	...	325	.....
	Average .....	...	...	412	
HYDRANT IN CITY.					
4557	Aug. 28, 1905, 9:30 a.m.....	68	38	220	not in 50cc
4558	Aug. 28, 1905, 11:20 a.m.....	72	...	375	not in 50cc
4559	Aug. 28, 1905, 12:15 p.m.....	...	...	135	.....
	Average	70	38	243	

Sample number.	Date.	Alkalinity.	Incrustants.	Bacteria per cc.	Colon present in 50cc
EFFLUENT AT FILTER HOUSE.					
4556	Aug. 28, 1905, 9:00 a.m.....	85	...	475	not in 50cc
4560	Aug. 28, 1905, 12:50 p.m.....	...	...	420	.....
4562	Aug. 28, 1905, 1:30 p.m.....	100	...	90	not in 50cc
4563	Aug. 28, 1905, 2:05 p.m.....	...	...	75	.....
4565	Aug. 28, 1905, 2:40 p.m.....	...	...	95	.....
4568	Aug. 28, 1905, 3:20 p.m.....	90	...	240	not in 50cc
4569	Aug. 28, 1905, 3:40 p.m.....	...	...	220	.....
*4571	Aug. 28, 1905, 4:15 p.m.....	...	...	180	.....
*4572	Aug. 28, 1905, 4:30 p.m.....	81	...	110	not in 50cc
*4576	Aug. 28, 1905, 5:30 p.m.....	76	41	130	not in 50cc
Average ... :		86.4	41	203	
Average of all filtered samples ...				212	

*Filled from second sedimentation tank after standing one hour. Alum reduced to "4½ grs. per gallon."

EFFICIENCY OF FILTRATION.

The agreement between the Wefugo Company and the village of Batavia was for an average of not more than 200 bacteria per cubic centimeter in the filtered water when the raw water had less than 7,000 bacteria per cc. From the results stated above it is seen that the average of the effluent samples was 203 and of all filtered samples 212. This shows that the filter was just failing to reach the required standard. The results are better than those obtained in the test of September, 1904, as would be expected since the sieves in the filter that were defective in the former test had been replaced by new ones a short time before the present test was made. The filter at this time was operated at the rate of 170,000 gallons per 24 hours which is about 1-3 faster than it was being operated in the test a year ago. If the filter had been working as slowly as before it is probable the results would have been quite up to the agreed standard. The amount of coagulant in use was stated as equivalent to nearly 6 grains per gallon and this was reduced in the latter part of the run (4 P. M.) to about 4½ grains, but the analyses indicate that a smaller amount of alum was in use. The samples collected prior to 4 P. M. were from the sedimentation tank that had been filled the night before, while the samples taken after 4 P. M. were from the sedimentation tank that had just been filled that afternoon. Thus in the latter part of the run with less coagulant and a shortened period of sedimentation a better average was obtained than during the early

part of the test with a larger amount of coagulant and a greater period of sedimentation. This would indicate that too long a period of sedimentation at this plant is not as desirable as a shorter period but a definite decision cannot be reached without further information.

CHARACTER OF THE FILTERED AND UNFILTERED WATERS.

The analyses indicate that East Fork of Little Miami River contains an undesirable amount of organic matter, and intestinal bacteria were present in each of the three samples tested for the presence of colon bacilli. It is not a suitable water to use for a public supply unless properly treated. On the other hand the filtered water was clear and of such a character as to be pleasing in appearance. Intestinal bacteria were not found in any of the filtered samples. These results indicate that the filtered water is an acceptable one to the consumers and a desirable water for a public supply. It might be mentioned that there is no undecomposed alum passing through into the filtered water nor is there likely to be as there is a big margin of safety shown by the alkalinities of the samples. It appears desirable that the filter be operated at a slightly slower rate.

WATER SUPPLY OF UPPER SANDUSKY.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4492	Aug. 9....	12	none	mere trace	none	.152	.014	none	none
4493	Aug. 9....	22	25	distinct	vegetative	.156	.020	none	none
4496	Aug. 9....	12	none	mere trace	none	.136	.010	none	none
4501	Aug. 10....	12	none	trace	none	.140	.018	none	none
4509	Aug. 10....	10	none	trace	none	.124	.046	trace	none
4513	Aug. 10....	10	none	mere trace	none	.182	.020	none	none
4514	Aug. 10....	25	25	distinct	vegetative	.232	.024	none	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4492	3.67	2.2	162	91	....	386	.....	200	not in 50cc
4493	5.58	2.0	177	97	....	402	.....	*	yes in 1cc
4496	3.54	3.0	180	174	....	531	.....	200	yes in 50cc
4501	3.31	3.3	177	176	....	534	.....	140	yes in 50cc
4509	2.90	4.6	188	211	....	629	.....	220	yes in 50cc
4513	3.02	2.8	149	149	....	392	.....	250	yes in 1cc
4514	4.81	2.1	171	99	....	412	.....	1,900	yes in 1cc

*Overspread.

The supply is obtained from Sandusky River and treated by mechanical filtration with alum as a coagulant. See Report for 1898, page 439, and Report for 1904, page 298.

Nos. 4493 and 4514. Unfiltered water from Sandusky River.

No. 4492. Effluent filter No. 1.

Nos. 4496 and 4509. Hydrants.

No. 4501. Standpipe.

No. 4513. Effluent from filters.

SANDUSKY RIVER WATER.

Sample number.	Date.	Oxygen required.	Alkalinity.	Incrustants.	Bacteria per cc.	Colon present in 50cc.
UNFILTERED.						
4493	Aug. 9, 1905, 5:30 p.m....	5.58	177	97	*	yes in 1cc
4495	Aug. 9, 1905, 6:00 p.m....	....	...	...	1,250	.....
4498	Aug. 9, 1905, 8:10 p.m....	....	...	...	1,350	.....
4499	Aug. 9, 1905, 9:00 p.m....	5.59	...	92	*	yes in 1cc
4502	Aug. 10, 1905, 8:30 a.m....	4.39	179	...	2,600	yes in 1cc
4504	Aug. 10, 1905, 9:30 a.m....	....	...	...	1,600	.....
4506	Aug. 10, 1905, 10:20 a.m....	....	...	...	1,700	.....
4512	Aug. 10, 1905, 1:20 p.m....	....	...	...	1,900	.....
4514	Aug. 10, 1905, 2:10 p.m....	4.81	171	99	1,900	yes in 1cc
4519	Aug. 10, 1905, 3:50 p.m....	....	...	...	1,200	.....
Average		5.09	175	96	1,687	
HYDRANT IN CITY.						
4496	Aug. 9, 1905, 7:30 p.m....	3.54	180	174	200	yes in 50cc
4501	Aug. 10, 1905, 7:30 a.m....	3.31	177	176	140	yes in 50cc
4509	Aug. 10, 1905, 11:15 a.m....	2.90	188	211	220	yes in 50cc
4510	Aug. 10, 1905, 12:50 p.m....	....	...	...	210	.....
Average		3.25	181	187	192	

Sample number.	Date.	Oxygen required.	Alkalinity.	Incrustants.	Bacteria per cc.	Colon present in 50cc.
	EFFLUENT AT FILTER HOUSE.					
4492	Aug. 9, 1905, 5:20 p.m....	3.67	162	91	200	not in 50cc
4494	Aug. 9, 1905, 5:50 p.m....	....	...	...	105	.....
4497	Aug. 9, 1905, 8:00 p.m....	....	...	...	260	.....
4500	Aug. 9, 1905, 9:15 p.m....	3.75	150	113	120	yes in 1cc
4503	Aug. 10, 1905, 8:45 a.m....	3.10	147	...	150	not in 50cc
4505	Aug. 10, 1905, 9:40 a.m....	....	...	...	140	.....
†4507	Aug. 10, 1905, 10:30 a.m....	....	...	...	330	.....
†4508	Aug. 10, 1905, 10:40 a.m....	....	...	...	390	.....
4511	Aug. 10, 1905, 1:10 p.m....	....	...	...	330	.....
4513	Aug. 10, 1905, 2:00 p.m....	3.02	149	149	250	yes in 1cc
†4515	Aug. 10, 1905, 2:50 p.m....	....	...	...	180	.....
†4516	Aug. 10, 1905, 3:00 p.m....	....	...	...	250	.....
4518	Aug. 10, 1905, 3:40 p.m....	....	...	...	250	.....
	Average	3.38	152	117	227	

*Overspread.

†Effluent from north filter.

‡Effluent from south filter.

EFFICIENCY OF FILTRATION.

As shown in the table above the average number of bacteria in the unfiltered river water was 1,687 per cubic centimeter, while the average for the effluents was 227. This gives a reduction of 86.5 per cent. Considered from the standpoint of percentage efficiency or from the actual number of bacteria in the effluent, it will be seen that the filtration was not up to the standard at the time of this test. It will also be noticed that intestinal bacteria were present in two out of the four samples of effluent tested for the presence of colon, which also indicates that the filtration was somewhat defective.

COAGULANT.

The coagulant used is sulphate of alumina. It is measured by means of a pail and the amount used as estimated by those operating the plant was 1½ grains to the gallon on August 9th, and this was increased to 3 1-3 grains on August 10th. No alum was present in any of the filtered samples and the analyses indicate that much more alum could be used without danger of any of it coming through in the effluent, since this water is able to care for a much larger amount of alum than was used. There is no occasion for the citizens to fear the presence of alum in the filtered water.

CHARACTER OF THE UNFILTERED AND FILTERED WATERS.

The chemical and the bacteriological results show that the unfiltered water contains considerable organic matter and has received some sewage. Intestinal bacteria were found in each of the samples tested in 1 cc. portions of the sample. The Sandusky River water is not suitable for use at this point without proper filtration.

While the analyses of the hydrant and effluent samples show a clear water with a decreased amount of organic matter, intestinal bacteria were present in a portion of the samples, thus indicating that the water is not free from all objection yet.

The analyses bring out a fact that is worthy of consideration. It will be noticed from the chemical analyses that the alkalinities and incrustants of the hydrant samples are much higher than those of the effluent samples. This appears to come from the seepage of ground water into the clear well. The total hardness of the hydrant water is in this manner increased 37 per cent.

In this connection it is only fair to state that some of the samples obtained from the hydrant at Upper Sandusky during 1904 were taken during periods when the filters were not in operation.

WATER SUPPLY OF VERMILION.

PARTS PER MILLION.

Sample number.	Collected.	Color.	Turbidity.	Sediment.	Odor.	Nitrogen as			
						Albuminoid ammonia.	Free ammonia.	Nitrites.	Nitrates.
4344	June 8	40	400	consid.	earthy	.342	.034	trace	none
4352	June 9	20	15	slight	sour veg.	.102	.016	none	none
4355	June 9	30	190	slight	ft. earthy	.156	.018	.002	none
4356	June 9	5	trace	very slight	none	.090	.012	trace	none

Sample number.	Oxygen required.	Chlorine.	Alkalinity.	Incrustants.	Iron.	Residue on evaporation.		Bacteria.	
						Total.	Loss on ignition.	No. per cc.	Colon present.
4344	10.18	5.4	73	18	1.2	356	54	54,000	.....
4352	2.52	8.0	80	2	.5	168	44	3,000	not in 50cc
4355	4.19	8.7	78	2	.7	208	42	*2,300	yes in 1cc
4356	2.32	9.0	80	9	.4	182	48	160	not in 50cc

*Overspread.

The supply is obtained from Lake Erie and treated by mechanical filters using sulphate of iron and lime.

Nos. 4333 and 4355. Unfiltered Lake Erie water.

No. 4352. Hydrant.

No. 4356. Effluent at filters.

LAKE ERIE WATER.

Sample number.	Date.	Alkalinity.	Incrustants.	Bacteria per cc.	Colon present in 50cc.
UNFILTERED.					
4335	June 8, 1905, 8:05 a.m.....	83	none	610	yes in 50cc
4337	June 8, 1905, 9:15 a.m.....	...	...	11,000	.....
4339	June 8, 1905, 10:10 a.m.....	...	...	24,300	.....
4341	June 8, 1905, 11:00 a.m.....	...	...	20,000	.....
4344	June 8, 1905, 1:50 p.m.....	73	18	54,000	.....
4346	June 8, 1905, 3:00 p.m.....	...	...	46,000	.....
4348	June 8, 1905, 4:30 p.m.....	...	...	12,500	.....
4350	June 9, 1905, 7:30 a.m.....	72	none	4,900	yes in 1cc
4353	June 9, 1905, 8:30 a.m.....	...	...	4,700	.....
4355	June 9, 1905, 9:00 a.m.....	78	2	2,300	yes in 1cc
4357	June 9, 1905, 9:30 a.m.....	...	...	3,200	.....
Average		76.5	5	16,683	
HYDRANT IN CITY.					
4334	June 8, 1905, 7:30 a.m.....	88	none	165	not in 50cc
4343	June 8 1905, 1:30 p.m.....	...	...	850	.....
4352	June 9, 1905, 8:00 am.....	80	2	3,000	not in 50cc
Average .....		...	...	1,338	
EFFLUENTS AT FILTER HOUSE.					
4336	June 8, 1905, 8:10 a.m.....	83	none	110	not in 50cc
4338	June 8, 1905, 9:20 a.m.....	...	...	550	.....
4340	June 8, 1905, 10:15 a.m.....	...	...	3,400	.....
4342	June 8, 1905, 11:10 a.m.....	...	...	14,400	.....
4345	June 8, 1905, 2:00 p.m.....	...	...	5,400	.....

Sample number.	Date.	Alkalinity.	Incrustants.	Bacteria per cc.	Colon present in 50cc.
4347	June 8, 1905, 3:05 p.m.....	...	...	2,400	.....
4349	June 8, 1905, 4:35 p.m.....	...	...	900	.....
4351	June 9, 1905, 7:40 a.m.....	79	17	530	not in 50cc
4354	June 9, 1905, 8:35 a.m.....	...	...	600	.....
4356	June 9, 1905, 9:05 a.m.....	80	9	160	not in 50cc
4358	June 9, 1905, 9:35 a.m.....	...	...	775	.....
Average of all filtered samples . .		82	5.6	2,374	
Average omitting No. 4342.....		...	...	1,449	

EFFICIENCY OF FILTRATION.

It will be noticed that there is a marked variation in the number of bacteria in the hydrant and effluent samples, the samples obtained from the water filtered during the middle of the day on June 8 running very much higher. This was due to the very unusual condition obtaining on that day. In the morning the lake water at the intake was of an ordinary character, but during the forenoon it changed with great rapidity and to an extreme degree, so that at noon it was perhaps the worst water of the year and a very hard one to properly filter.

For some weeks prior to this time the raw water had not been bad and the coagulating solutions in use were hardly strong enough to handle such an unusual water appearing so unexpectedly with an operator who had been in charge of the filtration plant but a few days.

Under these trying circumstances an effluent of inferior character was obtained for a few hours on June 8 since it was slightly turbid and ran high in the number of bacteria.

When the coagulant had been adjusted to the character of the raw water a proper effluent was again obtained.

The average efficiency of the plant during this test was 85.8 per cent. or if sample No. 4,342, representing an unusual occurrence lasting but a brief time, were omitted the efficiency would be 91.3 per cent.

The average amount of sulphate of iron used was 2.8 grains per gallon of water while the lime was about 1.25 grains.

CHARACTER OF THE UNFILTERED AND FILTERED WATERS.

As has been indicated above and as is shown by the analyses the unfiltered lake water was very bad at this time showing organic pollution as well as mud.

None of the effluent or hydrant samples tested showed the presence of intestinal bacteria and the findings indicate a usable hydrant water, while none of the filtered samples gave an excess of either lime or iron.

The first hydrant sample, taken soon after reaching Vermilion, shows the plant had been doing good work prior to the test. The record of Dr. Williamson, bacteriologist for the waterworks, shows a good filtration had been obtained during the preceding weeks.

This investigation would indicate that the plant at Vermilion is under ordinary circumstances yielding to the consumers a satisfactory water, and although at this particular period conditions were such as to yield for a short time an unsatisfactory effluent, yet the conditions were soon overcome by those in charge.

It is evident from this test how close a supervision there should be over a plant like the one at Vermilion using lime and iron as a coagulant with a water subject to such rapid and wide variation.

EXAMINATIONS OF MISCELLANEOUS WATERS

PARTS PER

Sample Number.	Place.	Date collected.		Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.	Odor.
		Month.	Day.						
4485	Alliance	8	*9	Well	Typhoid				
4486	Alliance	8	*9	Well	Typhoid				
4487	Alliance	8	*9	Cistern	Typhoid				
4712	Andover	11	*10	Drilled well	Typhoid				
4713	Andover	11	*10	Drilled well	Typhoid				
4659	Arcanum	10	9	Driven well	Typhoid	9	none	none	none
4591	Attica	9	7	Cistern	Typhoid		trace	trace	faint woody
4389	Barlow	6	25	Dug well	Typhoid	20	20	trace	faint sour
4190	Belmont-Flushing	1	2	Drilled well	Typhoid	15	10	very s.	earthy
4191	Belmont-Flushing	1	2	Drilled well	Typhoid	10	trace	trace	earthy
4683	Belmont-Mead	10	25	Spring	School	10	40	slight	putrefactive
4279	Bowling Green	4	*17	Well	Typhoid				
4280	Bowling Green	4	*17	Well	Typhoid				
4281	Bowling Green	4	*17	Well	Typhoid				
4283	Bowling Green	4	*17	Well	Typhoid				
4303	Bowling Green	5	2	Drilled well	Typhoid	10	none	trace	ft., peculiar
4304	Bowling Green	5	2	Cistern	Typhoid	60	15	slight	veg. & earthy
4305	Bowling Green	5	2	Drilled well	Typhoid	10	trace	trace	vegetative
4307	Bowling Green	5	2	Drilled well	Typhoid	10	trace	very sl.	none
4637	Bowling Green	9	22	Drilled well	Typhoid	12	trace	slight	trace
4638	Bowling Green	9	22	Drilled well	Typhoid	none	trace	very sl.	trace
4718	Bremen	11	13	Driven well	Typhoid		none	none	none
4466	Buckland	7	*22	Well	Pollution				
4523	Butler-Oxford	8	14	Dug well	Typhoid	15	10	trace	none
4699	Butler-Reiley	11	6	Dug well	Typhoid		trace	very sl.	trace, earthy
4700	Butler-Reiley	11	6	Dug well	Typhoid		none	none	none
4646	Bourneville	9	26	Driven well	Typhoid	trace	none	none	vegetative
4647	Bourneville	9	26	Driven well	Typhoid	none	none	none	none
4648	Bourneville	9	26	Driven well	Typhoid	3	none	none	none
4275	Cambridge	4	6	Dug well	Typhoid	10	trace	none	earthy
4274	Camden	4	4	Dug well	Typhoid	15			
4522	Cedarville	8	14	Drilled well	Typhoid	trace	trace	trace	none
4526	Cedarville	8	16	Drilled well	School	25			
4491	Chillicothe	8	9	Dug well	Typhoid	trace	trace	trace	none
4387	Clarington	6	26	Dug well	Typhoid	10	trace	trace	faint
4388	Clarington	6	26	Dug well	Typhoid	trace	trace	trace	faint
4476	Clarington	7	27	Dug well	Typhoid	trace	none	trace	none
4479	Clarington	7	31	Dug well	Typhoid	7	none	trace	none
4480	Clarington	7	31	Dug well	Typhoid	5	trace	trace	none
4711	Clarksville	11	9	Dug well	Typhoid	55	none	trace	trace
4639	Clinton-Chester	9	24	Dug well	Typhoid	trace	trace	trace	none
4204	Clinton-Wash'ton	1	30	Cistern	Typhoid	25	very sl.	slight	woody
4654	Clinton-Union	10	3	Dug & dr'd well	Typhoid	10	trace	trace	none
4324	Columb'a-Center	6	5	Spring	Quality	15	none	none	faint
4231	Columbus	2	24	Spring	Quality	15	none	none	none
4245	Columbus	3	15	Drilled well	Quality	30	30	very sl.	earthy
4488	Columbus	8	9	Well	Quality		none	none	none
4326	Columbus Grove	6	5	Dug well	Typhoid	20	none	trace	none
4313	Corning	5	18	Dug well	Typhoid	15	none	none	ft. woody
4701	Cortland	11	6	Dug well	Typhoid	10	none	none	none
4702	Cortland	11	6	Drilled well	Typhoid	10	none	very sl.	none
4249	Covington	3	21	Dug well	Typhoid	10	none	trace	none
4524	Covington	8	14	Drilled well	Typhoid	trace	none	none	none
4483	Darke-Butler	8	7	Dug well	Typhoid	12	none	none	none
4484	Darke-Butler	8	7	Dug well	Typhoid	25	trace	trace	none
4594	Defiance	9	4	Drilled well	School		none	trace	faint
4696	Delaware	11	6	Dug well	Quality	30		distinct	slight
4697	Delaware	11	6	Cistern	Quality		none	trace	woody (sl.)
4742	Delaware	12	1	Dug well	Typhoid		none	none	trace
4626	Delaw'r's-Thomp'n	9	18	Driven well	Typhoid	none	15	distinct	trace
4627	Delaw'r's-Thomp'n	9	18	Drilled well	Typhoid	none	10	distinct	none
4628	Delaw'r's-Thomp'n	9	18	Driven well	Typhoid	none	30	distinct	peculiar
4529	Dillonvale	8	17	Drilled well	Typhoid	trace	none	trace	none
4468	Dublin	7	23	Spring	Quality				
4469	Dublin	7	23	Well	Quality				
4381	Eaton	6	22	Dug well	Quality	120	15	very sl.	peculiar
4641	Fostoria	9	25	Drilled well	Typhoid	7	trace	slight	trace
4642	Fostoria	9	25	Drilled well	Typhoid	4	trace	trace	vegetative
4723	Fostoria	11	22	Drilled well	Typhoid	none	none	none	none

*Date received.

FROM PRIVATE SUPPLIES AND SPECIAL SOURCES.

MILLION.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Total Solids.	Colon Present in 50 cc.	Bacteria per cc.	Remarks.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.						
.....	.....	.....	.....	.....	.....	.....	.....	in 1cc	1000	Polluted.
.....	.....	.....	.....	.....	.....	.....	.....	yes	135000	Polluted.
.....	.....	.....	.....	.....	.....	.....	.....	yes	15000	Polluted.
.....	.....	.....	.....	.....	.....	.....	.....	no	350	Usable.
.....	.....	.....	.....	.....	.....	.....	.....	no	1800	Usable.
2.50	.328	4.760	.010	none	266.0	142	1025	no	13	Polluted.
1.15	.040	none	trace	trace	24	58	.....	no	110	Potable.
2.65	.106	.038	.010	4.8	11.2	79	254	in 1cc	700	Polluted.
.57	.012	.003	trace	7.0	26.5	298	608	in 1cc	850	Unsafe.
.52	.018	.004	trace	7.0	17.8	344	525	in 1cc	675	Unsafe.
1.17	.038	none	.002	6.0	1.5	243	376	no	1900	Usable, protect.
.....	.....	.....	trace	.....	.....	.....	.....	no	6200	High in bacteria.
.....	.....	.....	trace	.....	.....	.....	.....	no	19000	High in bacteria.
.....	.....	.....	trace	.....	.....	.....	.....	no	25000	High in bacteria.
.....	.....	.....	trace	.....	.....	.....	.....	no	16000	High in bacteria.
.85	.024	.006	none	none	3.7	88	153	no	12600	Usable.
.....	.....	.....	.400	trace	1.0	.....	.....	no	1900	Usable.
1.87	.116	.034	.008	trace	37.0	268	616	no	90	Usable, protect.
.....	.....	.....	mr tr	none	5.3	.....	.....	no	225	Potable.
1.66	.046	.024	.006	none	25.7	256	629	no	130	Usable, protect.
1.12	.074	.016	.128	14.0	28.6	212	592	no	75	Past pollution.
.49	.020	.002	none	10.0	36.9	258	683	no	45	Undesirable, past pollution
3.30	.....	.....	trace	none	8.5	.....	.....	in 1cc	1100	Some pollution.
1.17	.078	.006	none	20.0	29.5	331	781	in 1cc	620	Polluted.
3.07	.116	none	.024	30.0	36.0	384	746	in 1cc	1050	Polluted.
2.28	.086	.002	.002	8.0	23.5	321	883	no	630	Undesirable.
.64	.034	none	.032	5.0	10.1	327	499	no	15	Past pollution.
.61	.006	none	.026	30.0	15.0	323	585	no	none	Past pollution.
.59	.010	.004	.040	28.0	59.2	356	744	in 1cc	700	Polluted.
1.30	.060	.016	trace	14.0	137.0	223	955	no	100	Past pollution.
.86	.....	.....	none	none	33.0	.....	.....	no	150	Usable.
2.03	.102	.006	none	10.0	45.6	286	690	in 1cc	2500	Polluted.
1.33	.....	.....	.050	30.0	.....	.....	.....	yes	275	Polluted.
2.17	.128	.014	none	.6	93.9	253	1270	in 1cc	1200	Polluted.
2.20	.152	.024	trace	32.0	139.0	142	952	in 1cc	950	Polluted.
.81	.064	.026	none	.6	29.1	42	441	no	1300	Usable, undesirable.
.71	.018	.004	none	.6	21.9	252	915	in 1cc	9000	Advised abandoning.
1.20	.050	.014	.008	.6	62.8	67	504	no	650	Usable.
1.10	.042	.022	.002	.8	44.5	70	505	in 1cc	1100	Unsafe.
15.52	1.840	.114	.450	5.0	262.5	226	1895	no	850	Polluted.
.91	.028	.004	trace	8.0	52.4	281	612	no	160	Past pollution.
5.17	.164	.188	.040	trace	.3	15	61	no	3300	Undesirable for drinking.
.81	.034	.002	trace	8.0	10.0	282	434	not in 1cc	250	Past pollution.
.66	.016	.020	none	none	2.0	67	132	no	43	Usable.
.60	.022	.016	.002	4.0	5.8	239	.....	yes	1000	Some pollution.
.29	.042	.186	trace	none	18.5	328	753	no	32	Usable.
.86	.028	none	none	none	7.1	186	492	in 1cc	800	Usable.
2.03	.558	.010	.004	10.0	92.0	333	778	in 1cc	800	Polluted.
2.25	.260	3.840	.018	6.0	185.0	172	702	in 1cc	1300	Polluted.
.60	.114	.022	.024	6.0	33.5	157	484	no	5	Some pollution.
.48	.076	.114	.018	none	17.5	243	390	no	1900	Some pollution.
.15	.034	.020	none	trace	2.0	276	354	no	325	Potable.
1.78	.066	.012	none	8.0	14.9	231	408	no	9500	Past pollution.
1.02	.042	trace	none	2.0	155.0	221	.....	in 1cc	7000	Polluted.
1.97	.070	trace	none	.6	19.5	326	552	in 1cc	140	Polluted.
1.36	.052	.120	trace	none	5.0	234	301	no	750	Usable.
9.10	.488	.050	.004	6.0	50.0	285	631	in 1cc	119000	Polluted.
8.01	.234	.352	.008	trace	5.5	20	103	in 1cc	33000	Polluted.
1.39	.096	trace	.001	24.0	25.5	254	2148	in 1cc	3600	Polluted.
.86	.022	.274	none	none	10.6	301	970	no	300	Usable.
.75	.032	.220	none	none	10.8	322	954	no	450	Usab e.
.99	.012	.130	none	none	4.3	436	695	no	5000	Usable.
.60	.012	trace	.002	2.0	24.0	396	1544	no	110	Usable.
1.90	.....	.....	none	.6	.....	.....	.....	not in 1cc	67	Usable.
.70	.....	.....	none	2	.....	.....	.....	no	361	Usable.
17.61	1.310	10.810	.200	44.0	127.2	336	1360	in 1cc	180000	Polluted.
1.53	.026	.006	trace	none	26.5	293	955	no	40	Usable.
1.12	.036	.004	trace	20.0	25.4	256	591	no	13	Past pollution.
.68	.050	.002	.010	16.0	31.9	248	623	no	400	Past pollution.

EXAMINATIONS OF MISCELLANEOUS WATERS, ETC.—Continued.

PARTS PER MILLION.

Sample Number.	Place.	Date collected.		Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.	Odor.
		Month.	Day.						
4546	Franklin-Jackson.	8	25	Dug well.....	Typhoid	.....	10	distinct	none.....
4691	Franklin-Jackson.	11	2	Dug well.....	Bowel trouble..	10	none	none	trace.....
4741	Franklin-Jackson.	11	29	Dug well.....	Quality	.....	none	trace	faint.....
4703	Franklin-Perry...	11	9	Dug well.....	Typhoid	10	none	none	none.....
4456	Fremont.....	7	17	Well.....	Typhoid	.....	.....	.....	.....
4457	Fremont.....	7	17	Well.....	Typhoid	.....	.....	.....	.....
4458	Fremont.....	7	17	Well.....	Typhoid	.....	.....	.....	.....
4459	Fremont.....	7	17	Well.....	Typhoid	.....	.....	.....	.....
4460	Fremont.....	7	17	Well.....	Typhoid	.....	.....	.....	.....
4461	Fremont.....	7	17	Well.....	Typhoid	.....	.....	.....	.....
4462	Fremont.....	7	17	Drilled well.....	Typh id.	.....	.....	.....	.....
4412	Gahanna.....	7	5	Dug well.....	Typhoid	trace	none	trace	putrefaction..
4413	Gahanna.....	7	5	Dug well.....	Typhoid	40	70	trace	peculiar.....
4205	Galion.....	1	31	Drilled well.....	Typhoid	20	trace	trace	trace.....
4206	Galion.....	1	31	Drilled well.....	Typhoid	20	trace	very sl.	tra e.....
4577	Galion.....	8	29	Dug well.....	School.....	.....	none	none	none.....
4578	Galion.....	8	29	Drilled well.....	School.....	.....	20	distinct	none.....
4538	Geneva.....	8	21	Dug well.....	Typhoid	.....	.....	.....	.....
4309	Grafton.....	5	9	Dug well.....	Typhoid	20	trace	trace	faint.....
4622	Grafton.....	9	14	Dug well.....	Typhoid	10	none	none	sl. vegetative..
4226	Gordan.....	2	20	Dug well.....	Typhoid	25	none	none	none.....
4436	Greene-Beaver C'k	7	12	Dug well.....	Typhoid	10	none	trace	none.....
4437	Greene-Beaver C'k	7	12	Drilled well.....	Typhoid	10	25	distinct	none.....
4682	Greene-Xenia.....	10	25	Drilled well.....	School.....	350	iron	much	earthy.....
4765	Greenville.....	12	28	Well.....	Quality	trace	20	slight	none.....
4766	Greenville.....	12	28	Well.....	Quality	.....	.....	.....	.....
4475	Harrison-German.	7	26	Spring.....	Typhoid	6	none	trace	peculiar.....
4668	Helena.....	10	10	Dug & dr'd well	Typhoid	none	trace	trace	none.....
4669	Helena.....	10	10	Dug & dr'd well	School.....	trace	tr., sand	trace	none.....
4737	Hiram.....	11	27	Dug well.....	Typhoid	.....	none	none	none.....
4755	Holmes-Saltcreek.	12	24	Dug well.....	Typhoid	none	none	none	trace.....
4414	Huron.....	7	6	Cistern.....	Typhoid	50	trace	slight	peculiar.....
4490	Huron.....	8	8	Dug well.....	Typhoid	trace	trace	trace	none.....
4377	Huron.....	6	21	Dug well.....	Typhoid	35	50	very sl.	faint.....
4378	Huron.....	6	21	Dug well.....	Typhoid	25	40	very sl.	faint.....
4734	Irondale.....	11	*28	.....	Quality	.....	.....	.....	.....
4735	Irondale.....	11	27	Spring.....	Quality	.....	none	none	faint.....
4736	Irondale.....	11	27	.....	Quality	.....	none	none	none.....
4756	Irondale.....	12	27	.....	Quality	.....	10	slight	trace.....
4757	Irondale.....	12	27	Dug well.....	.....	.....	.....	.....	.....
4758	Irondale.....	12	27	Dug well.....	.....	.....	.....	.....	.....
4759	Irondale.....	12	27	Dug well.....	.....	.....	.....	.....	.....
4760	Irondale.....	12	27	Dug well.....	.....	.....	.....	.....	.....
4271	Jamestown.....	3	30	Dug well.....	Quality	20	none	none	none.....
4465	Jefferson.....	7	20	Drilled well.....	Pollution	8	130	distinct	faint.....
4489	Jewett.....	8	9	Dug well.....	Typhoid	trace	none	none	none.....
4544	Kenton.....	8	24	Dug well.....	Typhoid	.....	trace	very sl.	faint woody...
4317	Killbuck.....	5	22	Driven well.....	Typhoid	trace	none	none	none.....
4645	Knox-Berlin.....	9	25	Drilled well.....	Typhoid	none	none	none	none.....
4656	Knox-Berlin.....	10	6	Dug well.....	Typhoid	10	trace	trace	none.....
4629	Knox-Clinton.....	9	20	Dug well.....	Typhoid	none	none	none	trace.....
4686	LaGrange.....	10	29	Dug well.....	Typhoid	10	none	none	none.....
4687	LaGrange.....	10	29	Dug well.....	Typhoid	15	none	trace	trace.....
4681	Lakeview.....	10	23	Drilled well.....	Typhoid	.....	10	slight	trace.....
4219	Lancaster.....	2	15	Well.....	Typhoid	20	10	very sl.	faint.....
4359	Lewisburg.....	6	12	Dug well.....	Typhoid	10	trace	trace	faint.....
4471	Lewisburg.....	7	24	Drilled well.....	Typhoid	10	8	very sl.	earthy.....
4593	Licking-Jersey...	9	8	Dug well.....	Typhoid	.....	trace	trace	vegetative.....
4470	Lodi.....	7	24	Dug well.....	Typhoid	.....	.....	.....	.....
4732	Lodi.....	11	27	Dug well.....	Typhoid	.....	trace	trace	trace.....
4733	Lodi.....	11	27	Dug well.....	Typhoid	.....	trace	trace	trace.....
4592	Loudonville.....	9	7	Drilled well.....	Typhoid	.....	none	mere tr	none.....
4624	Loudonville.....	9	18	Drilled well.....	Typhoid	trace	15	distinct	vegetative.....
4547	Mahoning-Smith...	8	27	Dug well.....	Typhoid	.....	none	trace	peculiar.....
4548	Mahoning-Smith...	8	27	Dug well.....	Typhoid	.....	trace	trace	none.....
4549	Mahoning-Smith...	8	27	Cistern.....	Typhoid	.....	trace	trace	woody & pecu.
4537	Malinta.....	8	21	Drilled well.....	Typhoid	10	trace	trace	trace.....
4379	Marietta.....	6	21	Dug well.....	Typhoid	10	trace	trace	sweetish.....
4527	Marietta.....	8	16	Dug well.....	Typhoid	.....	.....	.....	.....
4528	Marietta.....	8	16	Cistern.....	Typhoid	15	.....	.....	.....

*Date received.

EXAMINATIONS OF MISCELLANEOUS WATERS, ETC.—Continued.

PARTS PER MILLION.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Total Solids.	Colon Present in 50 cc.	Bacteria per cc.	Remarks.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.						
1.23	.046	.084	trace	none	14.2	435	537	no	700	Usable.
1.50	.070	.056	.044	9.0	78.7	254	800	in 1cc	550	Polluted.
1.27	.064	.048	.010	12.0	92.5	126	683	no	18000	Polluted.
.84	.098	.038	.006	4.0	38.0	261	1484	no	110	Past pollution.
1.38	.....	.....	.004	14.0	88.2	...	.....	in 1cc	1100	Polluted.
1.90	.....	.....	none	10.0	21.0	.....	.....	in 1cc	6600	Polluted.
1.15	.....	.....	none	25.0	76.8	.....	.....	in 1cc	1100	Polluted.
3.12	.....	.....	none	3.0	7.0	.....	.....	no	9000	Undesirable.
.88	.....	.....	none	5.0	37.5	.....	.....	no	275	Some past pollution.
1.96	.....	.....	none	40.0	91.0	.....	.....	no	325	Past pollution.
.....	.....	.....	none	6.0	22.3	.....	.....	in 1cc	260000	Polluted.
1.36	.042	.014	none	1.4	trace	328	683	no	600	Usable.
1.93	.038	.092	trace	none	11.0	330	646	no	100	Usable.
1.17	.042	.610	trace	none	33.7	365	695	no	45	Usable.
1.05	.082	.348	trace	none	30.1	333	753	no	7	Usable.
1.78	.058	.010	none	.2	16.9	216	454	no	220	Usable.
1.80	.042	.018	trace	none	15.5	216	436	no	32	Usable.
1.97	.....	.....	.....	12.0	26.4	.....	.....	no	4300	Some pollution.
2.07	.104	.018	trace	16.0	208.4	338	1257	no	750	Undesirable.
3.17	.098	.006	.024	4.0	465.4	384	2410	yes	750	Unsafe.
1.45	.070	.010	.018	15.0	111.5	301	800	no	200	Advise abandon.
.63	.048	.008	none	14.0	6.5	296	490	in 1cc	325	Undesirable.
1.20	.034	.036	trace	trace	340	1670	.....	no	140	Usable.
6.79	.406	.612	.006	none	3.0	342	712	no	2700	Unsuitable.
.37	.010	.294	.002	none	4.1	326	364	no	10	Usable, iron.
1.80	.....	.....	.002	none	3.4	.....	.....	no	70	Usable.
.79	.032	.042	.018	none	39.0	179	377	in 1cc	900	Unsatisfactory; bad location.
2.39	.132	none	.006	18.0	222.5	320	1008	no	140	Unsafe.
3.46	.194	.004	.004	14.0	132.5	296	840	no	400	Unsafe.
1.51	.098	none	.002	7.0	38.0	178	458	no	3400	Undesirable.
1.05	.034	trace	none	11.0	15.2	52	238	no	3100	Undesirable.
4.65	.154	.014	trace	none	trace	65	99	in 1cc	3200	Unsafe.
2.62	.090	none	none	3.4	44.0	304	1057	in 1cc	750	Unsafe.
4.00	.176	.152	.040	none	45.0	324	609	in 1cc	550	Unsafe.
6.13	.288	.068	.008	2.0	72.8	360	822	in 1cc	47000	Unsafe.
15.85	.....	.....	.030	3.0	18.3	.....	.....	yes	31500	Unsafe.
.76	.032	none	none	trace	.95	54	86	no	10	Potable.
.64	.014	.002	none	trace	.7	35	87	no	15	Potable.
.74	.014	.002	none	none	1.6	32	87	no	3100	Influenced by reservoir.
.60	.....	.....	none	10.0	24.6	.....	.....	no	600	Usable, undesirable.
.83	.....	.....	trace	5.0	16.3	.....	.....	no	1000	Usable, undesirable.
.90	.....	.....	.004	9.0	40.9	.....	.....	no	300	Suspicious.
1.86	.....	.....	.140	10.0	128.2	.....	.....	no	300	Unsafe.
1.77	.084	.006	none	4.0	204.0	463	1112	no	650	High inorganically.
1.76	.076	.224	none	trace	69.0	318	603	no	110	Usable.
1.06	.038	.006	none	.8	62.0	174	712	yes	600	Suspicious.
1.58	.094	.020	trace	.8	85.4	329	961	no	700	Usable.
.72	.024	.014	none	18.0	23.5	218	545	no	40	Past pollution.
.52	.012	.006	trace	trace	2.0	193	231	no	none	Potable.
.83	.030	none	none	5.0	11.2	215	313	in 1cc	210	Unsafe.
.47	.018	.002	none	16.0	67.0	248	671	no	210	Past pollution.
2.36	.092	.002	.008	6.0	53.5	393	1610	no	700	Undesirable.
1.15	.024	.080	.070	3.6	20.7	310	2859	no	300	Undesirable.
.87	.014	.022	.002	none	18.7	450	640	no	35	Usable.
.65	.024	.022	.002	none	12.8	217	352	no	375	Usable.
1.96	.050	trace	.008	40.0	90.5	339	1152	no	190	Polluted.
.48	.006	.002	none	.8	19.5	258	498	no	70	Usable.
.97	.072	none	.028	2.0	20.4	376	633	not in 1cc	55	Suspicious.
4.98	.....	.....	.004	.6	.....	.....	.....	in 1cc	850	Unsafe.
.87	.028	none	.003	8.0	39.5	265	911	no	none	Undesirable.
1.18	.040	none	.004	10.0	39.3	207	563	no	210	Undesirable; past pollution
.51	.008	none	none	18.0	14.2	172	430	no	none	Undesirable; past pollution.
.67	.008	.044	none	none	2.0	187	237	no	42	Potable.
1.74	.048	.070	.006	none	9.9	69	137	in 1cc	2100	Unsafe.
1.81	.068	.002	none	.2	24.4	394	1739	in 1cc	11000	Unsafe.
9.04	.244	.432	.070	.2	20.0	85	250	in 1cc	33000	Unsafe.
1.15	.056	.124	trace	.4	21.7	122	1249	no	24000	Usable.
2.42	.092	.020	.050	36.0	215.4	197	1411	in 1cc	500	Unsafe.
3.73	.....	.....	none	7.0	55.9	.....	.....	in 1cc	160000	Unsafe.
4.54	.....	.....	.070	1.0	12.9	.....	.....	in 1cc	27000	Unsafe.

EXAMINATIONS OF MISCELLANEOUS WATERS, ETC.—Continued.

PARTS PER MILLION.

Sample Number.	Place.	Date collected.		Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.	Odor.
		Month.	Day.						
4521	Medina.....	8	10	Cistern.....	Typhoid.....	35	trace	very sl.	strong-pecu...
4589	Medina.....	9	3	Cistern.....	Typhoid.....	10	none	trace	trace.....
4612	Mendon.....	9	11	Drilled well....	Typhoid.....	30	distinct	trace	trace.....
4440	Milford.....	7	14	Dug well.....	Typhoid.....	none	trace	trace	trace.....
4635	Montgom'y-Butler	9	21	Dug well.....	Typhoid.....	15	trace	trace	sl. vegetative..
4685	Montgom'y-Butler	10	26	Dug well.....	Typhoid.....	none	trace	trace	faint.....
4298	Montgom'y-Har'n	4	27	Dug well.....	Quality.....	trace	none	trace	faint musty...
4748	Mt. Gilead.....	12	11	Dug well.....	Typhoid.....	130	iron	decided	3 earthy.....
4207	Mt. Sterling.....	1	31	Dug well.....	Quality.....	18	slight	slight	putrefactive...
4473	Mt. Vernon.....	7	25	Dug well.....	Quality.....	.....	.....	.....	.....
4474	Mt. Vernon.....	7	25	Dug well.....	Quality.....	.....	.....	.....	.....
4693	Newark.....	11	6	Dug well.....	Typhoid.....	.....	none	none	none.....
4694	Newark.....	11	6	Driven well.....	Typhoid.....	.....	none	trace	none.....
4695	Newark.....	11	6	Driven well.....	Typhoid.....	.....	none	none	none.....
4724	Newcomertown..	11	27	Dug well.....	Typhoid.....	.....	none	none	trace.....
4692	New Paris.....	11	6	Drilled well.....	School.....	35	iron	slight	faint.....
4192	Noble-Enoch.....	1	2	Dug well.....	.....	10	trace	trace	peculiar.....
4679	Nottingham.....	10	17	.....	Pollution.....	.....	slight	trace	peculiar.....
4680	Nottingham.....	10	17	.....	Pollution.....	.....	600	decided	peculiar.....
4194	Ottawa.....	1	8	.....	.....	40	25	very sl.	oily.....
4195	Ottawa.....	1	8	.....	.....	40	60	decided	oily.....
4727	Oxford.....	11	27	Dug well.....	Typhoid.....	.....	trace	very sl.	vegetative.....
4728	Oxford.....	11	27	Dug well.....	Typhoid.....	.....	none	trace	trace.....
4729	Oxford.....	11	27	Cistern.....	Typhoid.....	.....	none	none	peculiar.....
4730	Oxford.....	11	27	.....	Typhoid.....	.....	15	slight	none.....
4731	Oxford.....	11	27	Cistern.....	Typhoid.....	.....	none	peculiar.....	.....
4284	Perry-Hopewell..	4	23	Drilled well....	Typhoid.....	trace	10	very sl.	trace.....
4285	Perry-Hopewell..	4	23	Dug well.....	Typhoid.....	trace	trace	none	trace.....
4308	Perry-Hopewell..	5	7	Dug well.....	Typhoid.....	10	10	very sl.	faint.....
4584	Perry-Reading...	9	1	Dug well.....	Typhoid.....	.....	trace	trace	none.....
4657	Perry-Reading...	10	19	Drilled well....	Typhoid.....	8	100	iron	distinct
4658	Perry-Reading...	10	7	Drilled well....	Typhoid.....	trace	40	iron	slight
4613	Pickaway-Pick'y.	9	*13	Dug well.....	Typhoid.....	none	.....	.....	.....
4630	Pickaway-Pick'y.	9	21	Dug well.....	Typhoid.....	none	none	none	peculiar.....
4533	Piqua.....	8	21	Driven well....	Typhoid.....	15	15	slight	earthy.....
4534	Piqua.....	8	21	Driven well....	Typhoid.....	20	15	slight	earthy.....
4653	Pleasant Valley..	10	*4	.....	Hardness.....	.....	.....	.....	.....
4328	Plymouth.....	6	6	Well.....	Quality.....	20	6	very sl.	earthy & veg..
4525	Pomeroy.....	8	16	Dug well.....	Typhoid.....	10	.....	.....	.....
4550	Pomeroy.....	8	28	Dug well.....	Typhoid.....	.....	trace	trace	trace.....
4610	Portsmouth.....	9	11	Cistern.....	Typhoid.....	.....	none	trace	faint woody..
4242	Preble-Dixon....	3	13	Dug well.....	Typhoid.....	20	none	trace	woody & ear'y
4240	Put-in-Bay.....	3	7	Drilled well....	Quality.....	15	trace	very sl.	faint earthy...
4210	Rendville.....	2	2	Dug well.....	Typhoid.....	high off col	10	trace	strong earthy.
4670	Richland-Monroe.	10	12	Dug well.....	Typhoid.....	5	none	trace	trace.....
4315	Salem.....	5	21	Driven well....	Quality.....	trace	trace	trace	trace.....
4704	Shelby.....	11	.....	Dug well.....	Typhoid.....	20	trace	slight	trace.....
4477	Sandusky-Sand'y.	7	31	Drilled well....	Typhoid.....	5	none	none	none.....
4595	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4596	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4597	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4598	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4599	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4600	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4601	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4602	Scottdown.....	9	11	Creek.....	.....	.....	.....	.....	.....
4603	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4604	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4605	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4606	Scottdown.....	9	11	Creek.....	.....	.....	.....	.....	.....
4607	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4608	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4609	Scottdown.....	9	11	Dug well.....	.....	.....	.....	.....	.....
4467	Seneca-Jackson..	7	21	Dug well.....	Typhoid.....	28	trace	trace	faint.....
4535	Sherodsville.....	8	21	Drilled well....	Typhoid.....	10	trace	trace	none.....
4536	Somerset.....	8	21	Dug well.....	Typhoid.....	.....	.....	.....	.....
4678	Somerset.....	10	18	Dug well.....	Typhoid.....	none	none	none	pecu.,—oysters
4650	South Charleston.	9	29	Driven well....	Typhoid.....	25	20	distinct	trace.....

*Date received.

EXAMINATIONS OF MISCELLANEOUS WATERS, ETC.—Continued.

PARTS PER MILLION.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Total Solids.	Colon Present in 50 cc.	Bacteria per cc.	Remarks.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.						
7.28	.180	.386	.020	2.0	94.1	178	884	in 1cc	15000	Unsafe.
1.31	.052	.002	none	none	45	84	no	no	390	Unsafe.
1.37	.030	.610	.002	none	14.6	225	1223	no	375	Unsafe; hard.
.86	.042	.002	none	8.0	20.7	259	668	in 1cc	970	Unsafe.
1.21	.048	.118	.028	none	8.0	346	412	in 1cc	1800	Unsafe.
2.98	.100	.192	.006	none	1.7	364	452	in 1cc	300	Unsafe.
1.93	.060	.036	.020	6.0	15.5	229	418	in 1cc	800	Unsafe.
1.38	.048	.010	.002	trace	97.4	414	....	no	1400	Unsafe, hard.
2.52	.018	.002	.004	trace	13.4	351	....	in 1cc	750	Unsafe.
.62	.....	.....	.006	none	2.5	....	....	no	400	Unsafe.
1.42	.....	.....	none	none	2.5	....	....	no	635	Unsafe.
.92	.064	.276	.016	14.0	45.4	287	972	no	7	Suspicious.
.55	.012	none	trace	14.0	41.8	339	834	no	27	Undesirable; protect.
.37	.008	none	.002	trace	41.4	244	521	no	none	Unsafe.
.65	.024	.002	.002	14.0	40.8	103	462	no	85	Past pollution.
1.46	.038	.412	trace	none	1.0	292	352	no	550	Unsafe.
1.12	.030	.004	trace	6.0	5.8	177	252	no	600	Protect.
9.40	.288	.276	.028	none	737.5	61	1666	in 1cc	16000	Polluted.
10.20	.428	.568	.650	none	265.0	83	1237	in 1cc	33000	Polluted.
7.92	.342	.530	.060	2.0	595.0	165	1841	in 1cc	4800	Polluted.
8.30	.646	.508	.060	2.0	594.0	165	1901	in 1cc	51000	Polluted.
.73	.060	.062	.002	8.0	4.3	223	336	no	95	Unsafe; protect.
1.17	.096	.092	.010	28.0	25.9	381	684	no	375	Suspicious; past pollution.
1.24	.118	.036	none	2.0	none	21	54	no	550	Unsafe.
1.80	.082	.014	.016	2.0	2.2	247	346	in 1cc	800	Unsafe.
1.06	.080	.004	trace	8.0	.3	25	69	no	none	Unsafe.
.77	.046	.034	.004	none	32.2	271	617	no	85	Unsafe.
1.05	.052	.012	.006	10.0	18.0	36	250	no	5400	Suspicious.
2.92	.116	.028	trace	.6	45.3	64	455	no	300000	Suspicious.
11.08	.054	.004	none	18.0	55.4	4	394	yes	120	Unsafe.
1.17	.016	.474	trace	10.0	3.7	339	388	no	7400	Undesirable.
1.04	.008	.016	.002	none	4.2	430	479	no	500	Unsafe.
.....	.....	.....	.....	.....	.....	.....	.....	in 1cc	2800	Unsafe.
1.14	.070	.042	none	none	131.6	487	1076	in 1cc	120	Unsafe.
1.68	.066	.080	none	1.4	48.3	354	743	in 1cc	1000	Unsafe.
2.11	.072	.040	none	trace	6.5	278	367	no	1800	Unsafe.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Soft.
1.41	.044	trace	.002	none	93.7	412	1236	.....	11000	Unsafe, undesirable.
.80	.....	.....	trace	1.6	.....	.....	.....	in 1cc	1100	Unsafe.
.93	.032	.020	trace	.6	14.7	171	452	.....	.....	Unsafe.
2.19	.056	.004	mir tr	trace	9.7	34	122	no	140	Unsafe.
.34	.030	.001	trace	5.0	28.5	278	479	no	375	Unsafe.
.93	.036	trace	none	6.0	5.2	236	381	.....	.....	Unsafe.
8.73	.236	.004	trace	trace	1.0	34	106	no	350	Suspicious.
1.79	.062	.028	.012	8.0	49.4	260	597	no	160	Suspicious.
.80	.058	.026	.002	17.0	41.5	66	416	no	110	Undesirable.
1.27	.114	.050	trace	none	37.7	334	1065	in 1cc	13500	Polluted.
.68	.010	.172	none	none	1.5	263	492	in 1cc	230	Undesirable.
.96	.....	.....	trace	8.0	72.0	....	....	in 1cc	650	Unsafe.
1.26	.....	.....	.180	7.0	32.0	....	....	in 1cc	400	Unsafe.
1.12	.....	.....	.018	14.0	67.0	44	....	in 1cc	5600	Unsafe.
1.46	.....	.....	trace	1.0	.5	....	....	in 1cc	1000	Unsafe.
2.14	.....	.....	.014	18.0	39.4	49	....	in 1cc	21300	Unsafe.
1.64	.....	.....	.012	8.0	56.2	24	....	in 1cc	210	Unsafe.
1.10	.....	.....	.006	22.0	69.4	....	....	in 1cc	160	Suspicious.
3.78	.....	.....	.004	trace	4.2	116	....	in 1cc	550	Unsafe.
1.12	.....	.....	.004	36.0	134.0	....	....	yes	450	Unsafe.
1.06	.....	.....	.016	10.0	18.4	....	....	in 1cc	2600	Unsafe.
1.34	.....	.....	.080	6.0	33.6	....	....	in 1cc	3600	Unsafe.
2.26	.....	.....	.004	none	7.4	99	....	in 1cc	16000	Unsafe.
2.80	.....	.....	.040	10.0	57.2	....	....	no	3800	Unsafe.
.90	.....	.....	.004	16.0	17.6	69	....	yes	300	Unsafe.
2.26	.....	.....	trace	.6	20.4	221	....	in 1cc	850	Unsafe.
5.51	.118	.022	none	.2	58.1	310	567	in 1cc	2000	Unsafe.
.64	.026	.344	trace	.4	6.3	144	181	no	95	Unsafe.
1.21	.....	.....	.002	trace	.....	.....	.....	in 1cc	4200	Unsafe.
.96	.030	.006	.008	2.0	13.5	63	151	no	375	Unsafe.
.81	.026	.710	none	none	13.1	417	592	no	600	Unsafe.

EXAMINATIONS OF MISCELLANEOUS WATERS, ETC.—Continued.

PARTS PER MILLION.

Sample Number.	Place.	Date collected.		Source of Sample.	Cause for Examination.	Color.	Turbidity.	Sediment.	Odor.
		Month.	Day.						
4651	South Charleston..	9	29	Driven well...	Typhoid.....	20	20	distinct	none.....
4611	Stark-Lake.....	9	10	Dug well.....	Typhoid.....	.....	none	trace	none.....
4551	Sugar Creek.....	8	28	Dug well.....	Typhoid.....	.....	.....	.....	.....
4552	Sugar Creek.....	8	28	Dug well.....	Typhoid.....	.....	.....	.....	.....
4553	Sugar Creek.....	8	28	Dug well.....	Typhoid.....	.....	.....	.....	.....
4554	Sugar Creek.....	8	28	Dug well.....	Typhoid.....	.....	.....	.....	.....
4555	Sugar Creek.....	8	28	Dug well.....	Typhoid.....	.....	.....	.....	.....
4640	Sunbury.....	9	25	Dug well.....	School.....	15	15	distinct	trace.....
4684	Tiffin.....	10	26	Drilled well...	Typhoid.....	.....	trace	trace	none.....
4273	Tontogony.....	4	2	Dug well.....	Typhoid.....	20	.....	.....	.....
4721	Trumbull-Hubb'd	11	14	Dug & dr'd well	Typhoid.....	5	trace	very sl.	trace.....
4539	Vinton-Clinton...	8	22	Dug well.....	Typhoid.....	8	trace	trace	none.....
4208	Wapakoneta.....	2	2	Cistern.....	Typhoid.....	30	trace	trace	earthy.....
4209	Wapakoneta.....	2	2	Well.....	Typhoid.....	15	trace	trace	none.....
4725	Warren.....	11	27	Drilled well...	Typhoid.....	.....	trace	very sl.	vegetative...
4726	Warren.....	11	27	Drilled well...	Typhoid.....	.....	trace	slight	vegetative...
4366	Washing'n-Belpre	6	16	Dug well.....	Typhoid.....	trace	trace	very sl.	peculiar.....
4655	Washing'n-Belpre	10	*6	Dug well.....	Typhoid.....	8	trace	trace	faint earthy...
4652	Washington C. H.	9	29	Dug well.....	Typhoid.....	5	none	none	none.....
4636	Wash'ton-Palmer.	9	21	Dug well.....	Typhoid.....	trace	none	mere tr	trace.....
4671	Wash'ton-Palmer.	10	15	Cistern.....	Typhoid.....	10	none	none	earthy.....
4587	Wash'ton-Warren.	9	4	Dug well.....	Typhoid.....	25	none	none	none.....
4754	Wayne-Baughman	12	26	Drilled well...	School.....	10	35	distinct	ft. putrefactive
4386	Wellington.....	6	26	Cistern.....	Quality.....	60	15	trace	woody.....
4660	Wellsville.....	10	10	Drilled well...	Quality.....	10	25 iron	distinct	none.....
4222	West Jefferson...	2	15	Dug well.....	Quality.....	10	none	none	faint.....
4248	West Jefferson...	3	20	Dr'n & dug well	Typhoid.....	30	50	distinct	veg. & earthy.
4542	West Mansfield...	8	24	Driven well...	Typhoid.....	.....	20	distinct	earthy.....
4543	West Mansfield...	8	24	Cistern.....	Typhoid.....	.....	trace	trace	woody.....
4310	West Union.....	5	9	Dug well.....	Typhoid.....	15	trace	none	faint.....
4311	West Union.....	5	9	Dug well.....	Typhoid.....	20	none	none	faint earthy...
4197	Weston.....	1	16	Pond.....	Quality.....	40	slight	slight	vegetative...
4200	Weston.....	1	19	Drilled well...	Typhoid.....	20	none	none	earthy.....
4541	Woodfield.....	8	21	Drilled well...	Typhoid.....	17	30	distinct	earthy.....
4203	Worthington.....	1	26	Dug well.....	Typhoid.....	10	trace	trace	faint earthy...
4698	Wyandot-Crawf'd.	11	6	Dug well.....	Typhoid.....	.....	6	slight	trace.....
4579	Zanesfield.....	8	30	Driven well...	Typhoid.....	.....	none	none	none.....

*Date received.

EXAMINATIONS OF MISCELLANEOUS WATERS, ETC.—Concluded.

PARTS PER MILLION.

Oxygen Required.	Nitrogen as				Chlorine.	Alkalinity.	Total Solids.	Colon Present in 50 cc.	Bacteria per cc.	Remarks.
	Albuminoid Ammonia.	Free Ammonia.	Nitrites.	Nitrates.						
.94	.032	.706	none	none	13.0	415	696	no	40	
.96	.034	.006	none	4.4	6.3	201	328	in Ice	9800	Unsafe.
.....	.....	.....	trace	9.0	22.0	.....	.....	no	210	Usable; protect.
.....	.....	.....	.008	9.0	24.5	.....	.....	no	250	Usable; undesirable.
.....	.....	.....	none	6.0	6.2	.....	.....	no	700	Usable.
.....	.....	.....	.010	2.0	38.1	.....	.....	no	550	Usable; undesirable.
.....	.....	.....	trace	11.0	17.7	.....	.....	no	230	Usable; undesirable.
1.30	.042	.012	none	none	4.5	329	556	no	120	Usable.
1.93	.026	.268	.040	none	13.0	283	504	in Ice	900	Unsafe.
3.50	.....	.....	.080	trace	126.0	.....	.....	no	300	Potable.
.38	.012	.194	.002	none	3.0	182	221	no	100	Potable.
1.35	.058	.018	trace	1.2	78.4	38	498	no	6800	Usable.
6.41	.172	.014	trace	trace	1.2	23	98	no	300	Usable.
.93	.048	trace	.020	16.0	53.2	159	571	no	150	Suspicious.
.73	.088	.804	none	2.0	18.7	346	459	no	325	Usable.
1.39	.050	.876	none	6.0	453.0	574	1410	in Ice	3200	Unsafe.
.13	.042	.030	.004	8.0	4.5	16	145	no	10000	Usable (?); protect.
4.51	.254	.002	.032	28.0	158.5	156	715	in Ice	14000	Unsafe.
.71	.024	.010	.002	20.0	53.2	314	732	in Ice	400	Undesirable.
1.02	.138	none	.021	40.0	48.0	152	620	in Ice	1200	Unsafe.
1.74	.046	.002	none	5.0	22.0	36	154	in Ice	9000	Usable; undesirable.
2.93	.078	.002	.008	2.0	4.5	85	159	in Ice	625	Unsafe.
1.60	.024	.620	none	none	1.4	190	245	no	500	Usable.
6.55	.284	.272	.160	none	.7	48	139	no	14900	Undesirable.
2.10	.126	.152	.012	none	250.0	277	858	no	3	Undesirable.
.35	.058	.012	none	2.0	45.2	261	544	no	300	Usable; protect.
.84	.052	.576	.014	none	2.5	351	643	no	2	Usable.
1.18	.078	.252	none	none	5.1	230	816	no	20	Usable.
7.17	.370	.384	.004	none	trace	36	65	no	3200	Undesirable.
.88	.068	.020	mr tr	20.0	39.5	201	540	.....	.....	Undesirable; past pollution.
.87	.024	.....	mr tr	4.0	16.4	167	273	.....	.....	Undesirable; past pollution
7.47	.450	.150	.040	4.0	43.8	134	1544	no	10700	Unfit for ice supply.
.15	.028	.002	.002	trace	56.3	56	3155	no	500	Usable.
1.45	.054	.030	trace	none	19.7	150	270	no	425	Usable.
1.31	.048	.012	trace	none	83.5	103	582	no	375	Usable.
.85	.024	.004	.006	none	2.6	307	406	no	240	Usable.
.56	.030	.004	none	5.0	2.0	248	343	no	750	Usable; protect.

CITY AND VILLAGE
HEALTH OFFICERS:

Appointed to Serve in Lieu of a Board of Health by Council
Appointed by the Board of Health.

Corrected to June 1, 1906.

HEALTH OFFICERS APPOINTED BY COUNCIL TO SERVE IN LIEU OF A
BOARD OF HEALTH, AND APPROVED BY THE STATE BOARD OF
HEALTH, UNDER SECTION 187 OF THE MUNICIPAL CODE.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
Adamsville.....	George W. McDowell....	Jan. 1, 1906	Feb. 6, 1906	1907
Addyston (Sekitan P. O.).....	J. H. Haire, M.D.....	Jan. 9, 1906	Jan. 29, 1906	1907
Agosta.....	(See New Bloomington)..			1907
Amelia.....	Charles Coleman.....	Feb. 7, 1906	Feb. 28, 1906	1907
Anna.....	D. R. Milliette, M.D. ...	Jan. 8, 1906	Feb. 6, 1906	1907
Ansonia.....	C. I. Stephen, M.D.....	Jan. 22, 1906	Jan. 25, 1906	1907
Antioch.....	D. W. Lowe, M.D.....	Jan. 18, 1906	Jan. 31, 1906	1908
Antwerp.....	Andrew J. Schilb.....	Jan. 2, 1906	Jan. 17, 1906	1907
Apple Creek.....	Joseph K. King, M.D. ...	Mar. 5, 1906	Mar. 9, 1906	1907
Arcadia.....	W. W. Moore.....	Jan. 15, 1906	Jan. 17, 1906	1907
Arlington Heights...	H. R. Vedder.....	Feb. 7, 1905	Mar. 29, 1905	1907
Ashland.....	E. A. Kauffman.....	Jan. 15, 1906	Jan. 24, 1906	1908
Ashley.....	Rodman Welch.....	July 3, 1905	July 17, 1905	1907
Athalia.....	Charles F. Clark.....	Feb. 3, 1906	Feb. 10, 1906	1907
Attica.....	C. A. Force, M.D.	Aug. 1, 1905	Sept. 13, 1905	1908
Bainbridge.....	R. H. McKee, M.D.....	Mar. 14, 1904	Apr. 1, 1904	1907
Bairdstown.....	A. W. Solomon.....	Feb. 2, 1905	Apr. 26, 1905	1908
Barberton.....	Bert Rodenbaugh, M.D..	Aug. 28, 1905	Sept. 15, 1905	1908
Beaver.....	E. B. Schrock, M.D.....	June 20, 1905	June 28, 1905	1907
Belle Valley.....	C. E. Henry.....	Apr. 16, 1906	Apr. 30, 1906	1907
Belmont.....	H. O. Gatten.....	Mar. 8, 1905	Apr. 19, 1905	1907
Berlin Cross Roads..	Henry Davis.....	June 6, 1905	June 16, 1905	1907
Berlin Heights.....	G. W. Hine, M.D.....	Aug. 18, 1905	Sept. 23, 1905	1907
Berne P. O.....	(See Carlisle).			1907
Bethel.....	W. E. Thompson, M.D..	June 21, 1905	June 26, 1905	1908
Bettsville.....	C. G. Norton.....	Jan. 13, 1906	Jan. 22, 1906	1907
Blakeslee.....	James B. Lauchlin.....	Mar. 1, 1905	Mar. 11, 1905	1907
Blanchester.....	U. B. Chambers.....	July 3, 1905	July 12, 1905	1907
Bloomdale.....	G. W. Urie.....	Sept. 20, 1904	Oct. 7, 1904	1910
Bloomburg.....	H. W. Worrell.....	Feb. 19, 1906	Feb. 23, 1906	1907
Bolivar.....	Conrad H. Lebold.....	Jan. 30, 1906	Feb. 1, 1906	1907
Botkins.....	Jacob Zaenglein.....	Dec. 5, 1905	Dec. 18, 1905	1907
Bowerson.....	Joseph Penn.....	†Apr. 3, 1905	Aug. 16, 1905	1907
Bowersville.....	J. E. Steward.....	June 7, 1905	June 12, 1905	1907
Bradford.....	H. J. McKinney.....	Jan. 1, 1906	Jan. 17, 1906	1908
Bradner.....	O. J. Mitchell.....	June 29, 1905	July 11, 1905	1907
Bratenahl.....	J. G. Newkirk.....	Jan. 6, 1905	Feb. 2, 1905	1907
Bremen.....	Frank P. Strayer, M.D. .	Oct. 3, 1904	Oct. 14, 1904	1910
Bridgeport.....	W. M. Oates, M.D.....	May 3, 1904	Jan. 17, 1906	1907
Brinkhaven P. O....	(See Gann.)			1907
Brooklyn Heights...	Joseph E. Richardson...	Jan. 16, 1906	Jan. 22, 1906	1907
Broughton.....	James Boroff.....	May 4, 1905	June 28, 1905	1907
Burbank.....	A. W. Hoffman.....	Feb. 5, 1906	Feb. 8, 1906	1907
Butler.....	William W. Thuma.....	Apr. 2, 1906	Apr. 11, 1906	1907
Butlerville.....	John R. Hitsman.....	Jan. 1, 1906	Jan. 17, 1906	1907
Byesville.....	John W. Geary.....	Feb. 16, 1906	Feb. 28, 1906	1907
Cadiz.....	W. H. Lemmon, M.D. ...	Jan. 5, 1906	Jan. 17, 1906	1907
Caldwell.....	J. L. Gray, M.D.....	June 1, 1905	Feb. 10, 1906	1907
Camden.....	W. E. Pryor, M.D.	May 8, 1905	May 31, 1905	1907
Canal Winchester...	John W. Shook.....	Feb. 5, 1906	Feb. 28, 1906	1908
Cannelsville (Dillon P. O.).....	R. T. Homman.....	May 4, 1905	Aug. 10, 1905	1908

†Term began May 1, 1905.

HEALTH OFFICERS APPOINTED BY COUNCIL, ETC.—Continued.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
Cardington.....	W. A. Smith, M.D.....	Apr. 2, 1906	May 8, 1906	1907
Carey.....	Joseph F. Wonder.....	June 13, 1904	July 11, 1904	1907
Carlisle (Berne P. O.)	W. R. Bromhall.....	Jan. —, 1906	Jan. 10, 1906	1908
Carthage.....	Samuel B. Gilchrist.....	Jan. 16, 1906	Jan. 25, 1906	1907
Casstown.....	W. W. Baker, M. D.....	Jan. 26, 1906	Feb. 3, 1906	1908
Cecil.....	C. W. Boland.....	Jan. 2, 1906	Mar. 9, 1906	1908
Centerville.....	Dudley Keever, M.D....	June 22, 1905	July 11, 1905	1907
Chagrin Falls.....	D. A. Groves.....	Jan. 5, 1906	Jan. 17, 1906	1908
Chambersburg (Eu- reka P. O.).....	W. J. Fletcher, M.D. . .	*Sept. 5, 1905	.....	1907
Chardon.....	H. L. Williams.....	Jan. 4, 1906	Mar. 26, 1906	1907
Chatfield.....	Samuel Lutz.....	Jan. 13, 1905	Jan. 26, 1905	1907
Chesterhill.....	William Johnson.....	Apr. 3, 1905	Apr. 19, 1905	1907
Cheviot.....	Charles Craig.....	Jan. 17, 1906	Jan. 22, 1906	1907
Chickasaw.....	H. S. Schaefer.....	Apr. 3, 1906	May 8, 1906	1907
Clarksburg.....	Floyd Parker.....	Jan. 2, 1906	Feb. 23, 1906	1907
Clarksville.....	Ezekial Cast.....	Mar. 2, 1905	Mar. 29, 1905	1907
Cleveland Heights...	W. E. Shackleton, M.D..	Jan. 16, 1906	Jan. 22, 1906	1907
Cleves.....	W. C. Hughes, M.D.....	Mar. 6, 1906	Mar. 16, 1906	1907
Coalton.....	J. C. Duncan.....	Jan. 31, 1906	Feb. 3, 1906	1907
College Corner.....	J. Emery Paxton.....	Feb. 5, 1906	Feb. 28, 1906	1908
Columbus Grove....	J. F. Bogart.....	May 1, 1905	May 13, 1905	1907
Commercial Point...	John Chenault.....	Apr. 17, 1905	June 12, 1905	1907
Continental.....	W. J. Conklin.....	Jan. 4, 1906	Jan. 24, 1906	1907
Corning.....	William Anderson.....	May 16, 1905	May 22, 1905	1907
Corwin.....	Jacob I. Clark.....	Jan. 31, 1906	Feb. 10, 1906	1909
Creston.....	Charles A. Mellen.....	Jan. —, 1906	Jan. 9, 1906	1908
Croton P. O.....	(See Hartford.)			
Crown City.....	J. B. Stevers.....	Sept. 22, 1905	Sept. 27, 1905	1908
Cumberland.....	J. T. Aiken.....	Feb. 13, 1906	Mar. 9, 1906	1908
Custar.....	H. Mannhardt.....	Feb. 5, 1906	Feb. 16, 1906	1907
Cuyahoga Falls....	William W. Scupholm...	May 17, 1905	June 9, 1905	1907
Dalton.....	J. Coleman Haney, M.D..	Jan. 5, 1906	Jan. 17, 1906	1907
DeGraff.....	J. W. Hendershott.....	Jan. 9, 1906	Jan. 17, 1906	1907
Dell Roy.....	S. W. Snee.....	Jan. 8, 1906	Jan. 27, 1906	1907
Delphos.....	Ezra Burnett, M.D.....	Jan. 23, 1906	Jan. 31, 1906	1907
Deshler.....	Isaac Collier.....	Jan. 20, 1906	Jan. 23, 1906	1907
Dexter City.....	E. E. Coborn, M.D.....	July 1, 1905	Sept. 15, 1905	1907
Dillons P. O.....	(See Cannelsville.)			
Doylestown.....	Frank DeNise.....	Mar. 5, 1906	Mar. 16, 1906	1907
Dublin.....	Fay Eberly.....	Jan. 22, 1906	Apr. 5, 1906	1907
Dunkirk.....	C. C. McLaughlin, M.D..	Aug. 21, 1905	Sept. 5, 1905	1907
Dupont.....	C. L. Speck.....	Feb. 13, 1905	Mar. 3, 1905	1907
East Springfield....	Harry L. Fiscus, M.D....	Sept. 12, 1904	Sept. 13, 1904	1908
Eaton.....	Geo. W. Jones.....	Jan. 8, 1906	Jan. 17, 1906	1908
Edison.....	John H. Jackson M.D....	Sept. 21, 1905	Oct. 16, 1905	1909
Elmore.....	R. A. Willett, M.D.....	June 6, 1905	June 22, 1905	1907
Euclid.....	P. J. Cooney.....	Jan. 22, 1906	Feb. 10, 1906	1907
Eureka P. O.....	(See Chambersburg.)			
Fairfield.....	Z. T. Hebble.....	*May 8, 1906	.....	1908
Fairport.....	J. H. Werbeach.....	Feb. 28, 1905	Mar. 11, 1905	1907
Farmersville.....	Henry P. Oldfather.....	May 2, 1906	May 21, 1906	1907
Fayetteville.....	F. A. Johnson, M.D.....	May 7, 1906	May 16, 1906	1907
Felicity.....	Charles N. Crawford.....	Jan. 26, 1906	Jan. 31, 1906	1907
Fernbank.....	James E. Hickman.....	May 3, 1903	Mar. 11, 1905	1909

*Appointed by the State Board of Health.

HEALTH OFFICERS APPOINTED BY COUNCIL, ETC.—Continued.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
Flushing.....	George Wheeler.....	Aug. 7, 1905	Aug. 24, 1905	1907
Frankfort.....	L. N. Matteson.....	Jan. 22, 1906	Feb. 10, 1906	1907
Franklin.....	John B. Miller.....	Jan. —, 1906	Jan. 9, 1906	1907
Frazeysburg.....	John W. Blizzard.....	Jan. 9, 1906	Jan. 31, 1906	1907
Freeport (Prairie De- pot P.O.).....	J. W. Graham.....	Jan. —, 1906	Jan. 9, 1906	1907
Freeport (Harrison County).....	Stewart Ferrell.....	Jan. 8, 1906	Jan. 17, 1906	1907
Gann (Brink Haven P. O.).....	David C. Cunningham...	Feb. 26, 1906	Mar. 16, 1906	1908
Garrettsville.....	Geo. R. French, M.D....	Jan. —, 1906	Jan. 9, 1906	1907
Georgetown.....	Samuel F. Walker.....	Jan. 20, 1906	Feb. 16, 1906	1907
Gettysburg.....	John E. Monger, M.D....	Oct. 23, 1905	Nov. 3, 1905	1907
Genoa.....	George W. Wright.....	Jan. 31, 1906	Feb. 23, 1906	1908
Geyer.....	Thomas H. Irwin.....	Jan. 2, 1906	Feb. 10, 1906	1907
Glendale.....	Clifford Allen.....	Feb. 5, 1906	Feb. 16, 1906	1907
Glouster.....	David Dille.....	Jan. 16, 1906	Jan. 31, 1906	1907
Gnadenhutten.....	L. S. Winsch.....	Feb. 5, 1906	Apr. 5, 1906	1908
Gordon.....	H. Z. Silver.....	Jan. 23, 1905	Feb. 2, 1905	1907
Grafton.....	John Cahill.....	Jan. —, 1906	Jan. 12, 1906	1907
Grand Rapids.....	L. L. Mowan.....	Oct. 2, 1905	Oct. 21, 1905	1907
Gratis P. O.	(See Winchester.)			
Green Camp.....	G. W. Collins.....	Jan. —, 1906	Feb. 8, 1906	1908
Greenfield.....	C. S. Clouser.....	Jan. —, 1906	Jan. 9, 1906	1907
Grove City.....	J. William Benjamin....	Feb. 8, 1906	Feb. 16, 1906	1907
Grover (Tiltonville P. O.).....	Wm. Cunningham.....	Feb. 9, 1906	Mar. 9, 1906	1908
Grover Hill.....	G. W. Morris.....	Feb. 12, 1906	Feb. 23, 1906	1907
Hanover.....	D. O. Roberts, M.D....	Jan. 8, 1906	Jan. 17, 1906	1907
Harrisonburg.....	Mason Sealock.....	Jan. 8, 1906	Jan. 17, 1906	1907
Harrod.....	John Blair, Sr.....	Aug. 16, 1905	Sept. 23, 1905	1907
Hartford (Croton P. O.).....	C. B. Hempstead.....	Jan. 9, 1906	Jan. 31, 1906	1907
Harveysburg.....	Samuel J. Ellison, M.D..	Mar. 5, 1906	Mar. 26, 1906	1907
Haskins.....	William H. North.....	Mar. 5, 1906	Apr. 5, 1906	1908
Haviland.....	George Sharp.....	Feb. 12, 1906	Feb. 26, 1906	1908
Hebron.....	O. M. Kramer, M.D....	June 30, 1905	July 5, 1905	1907
Higginsport.....	F. M. Cahill.....	Aug. 7, 1905	Aug. 9, 1905	1907
Hilliards.....	C. S. Latham, M.D....	Nov. 20, 1905	Mar. 9, 1906	1908
Hollansburg.....	A. W. Meek, M.D....	Feb. 1, 1904	Feb. 6, 1904	1908
Hopedale.....	Elmer T. Kuhn, M.D....	Jan. —, 1906	Jan. 9, 1906	1907
Hoytville.....	Charles E. Frederick....	Apr. 30, 1906	May 8, 1906	1907
Huntsville.....	George W. Jones, M.D....	Aug. 1, 1905	Aug. 19, 1905	1907
Huron.....	Robert Day.....	Jan. 8, 1906	Feb. 16, 1906	1907
Irondale.....	Albert Culp.....	Nov. 14, 1905	Nov. 27, 1905	1907
Jackson Center.....	A. V. Derr, M.D....	Jan. 15, 1906	Jan. 17, 1906	1907
Jefferson.....	W. S. Andrews.....	Jan. —, 1906	Jan. 10, 1906	1907
Jeffersonville.....	William Reid.....	Jan. 9, 1906	Jan. 22, 1906	1907
Jeromeville.....	George Schroll.....	Jan. 17, 1906	Feb. 10, 1906	1907
Jewett.....	John Wesley Lucas.....	Feb. 7, 1905	Feb. 14, 1905	1907
Junction City.....	F. J. Crosbie, M.D....	Jan. 15, 1906	Jan. 17, 1906	1907
Kalida.....	Henry Reeker.....	July 17, 1905	July 26, 1905	1907
Kettlersville.....	O. O. Lemaster, M.D....	Jan. 5, 1906	Feb. 23, 1906	1907
Kossuth.....	William Earhart.....	Feb. 2, 1906	Feb. 23, 1906	1908
Lakeview.....	E. D. Carr.....	Oct. 18, 1904	Jan. 26, 1905	1907
Larue.....	G. L. Markwith.....	Feb. 5, 1906	Mar. 9, 1906	1907

HEALTH OFFICERS APPOINTED BY COUNCIL, ETC.—Continued.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
Laura.....	Charles O. Hall.....	Jan. 8, 1906	Jan. 24, 1906	1907
Leesville.....	A. R. Morrison.....	Jan. —, 1906	Jan. 10, 1906	1907
Lexington.....	J. P. Stober, M.D.....	June 5, 1905	June 9, 1905	1907
Limaville.....	O. P. Sebrell.....	July 1, 1905	July 12, 1905	1907
Lindsey.....	Wm. E. Higbie, M.D.....	Feb. 5, 1906	Feb. 28, 1906	1907
Lisbon.....	David H. Eells.....	Jan. —, 1906	Jan. 10, 1906	1907
Lithopolis.....	Felix N. Taes.....	Jan. 13, 1906	Jan. 17, 1906	1907
Lockbourne.....	Leon Harrison.....	Jan. 9, 1906	Jan. 17, 1906	1907
Lockland.....	Peter Butchart.....	Jan. 8, 1906	Jan. 17, 1906	1907
Lodi.....	Henry Selders.....	*May 31, 1905	.....	1907
London.....	W.H.Christopher, M.D.....	June 9, 1905	June 12, 1905	1908
Lore City.....	Joseph Todd.....	Feb. 5, 1906	Feb. 16, 1906	1907
Loveland.....	F. H. Leever, M.D.....	Feb. 5, 1906	Feb. 16, 1906	1907
Lowellville.....	Charles M. Clarke.....	May 7, 1906	May 21, 1906	1907
Lucas.....	William Baer.....	Jan. 1, 1906	Feb. 16, 1906	1907
Lyons.....	Thomas Blair, M.D.....	Feb. 5, 1906	Feb. 28, 1906	1908
McArthur.....	George W. Partrow.....	Jan. 1, 1906	Jan. 23, 1906	1907
McComb.....	Scott W. Preble.....	Feb. 5, 1906	Feb. 16, 1906	1907
Macksburg.....	O. S. Gilchrist.....	Apr. 5, 1906	Apr. 30, 1906	1908
Madison.....	C. H. Quayle, M.D.....	Jan. 16, 1906	Jan. 24, 1906	1907
Maineville.....	Joseph G. Trimble.....	Feb. 5, 1906	Feb. 23, 1906	1907
Marengo.....	I. E. Eakins.....	Mar. 13, 1905	Mar. 22, 1905	1907
Marseilles.....	E. S. Jones, M.D.....	Apr. 3, 1905	Apr. 13, 1905	1907
Marshallville.....	E. P. Willford.....	Feb. 5, 1906	Feb. 8, 1906	1907
Martinsburg.....	N. S. Toland, M. D.....	Feb. 20, 1905	Mar. 15, 1905	1908
Marysville.....	C. W. Hoopes, M.D.....	Jan. 25, 1906	Jan. 31, 1906	1907
Maumee.....	Philip Hartman.....	Jan. 19, 1906	Jan. 25, 1906	1907
Medina.....	F. L. Harding.....	Feb. 13, 1906	May 8, 1906	1907
Melrose.....	Thomas J. Meyers.....	June 14, 1905	June 16, 1905	1907
Mendon.....	Chas. B. Harbauer, M.D.....	Mar. 3, 1905	Mar. 11, 1905	1907
Mentor.....	J. W. Lowe, M.D.....	Jan. 3, 1906	Feb. 16, 1906	1907
Mifflin.....	Jas. H. S. Hutchison, M.D.....	Feb. 2, 1906	Feb. 10, 1906	1908
Milan.....	George W. Curtis.....	Jan. 22, 1906	Mar. 9, 1906	1907
Milford.....	Con. W. Gateh, M.D.....	Sept. 26, 1905	Oct. 16, 1905	1907
Milford Center.....	Martin Frye.....	Apr. 13, 1906	May 8, 1906	1908
Miltonsburg.....	Chas. R. Keyser, M.D.....	Jan. —, 1906	Jan. 12, 1906	1907
Minerva.....	Elmer E. Fultz.....	Jan. 23, 1906	Feb. 10, 1906	1908
Mingo Junction.....	W. W. McMillan, M.D.....	Jan. 12, 1906	Feb. 10, 1906	1907
Minster.....	C. H. Dickman.....	Jan. 12, 1906	Jan. 24, 1906	1907
Montezuma.....	George Stafford.....	May 9, 1906	May 21, 1906	1907
Morristown.....	A. M. Poole.....	Jan. —, 1906	Jan. 10, 1906	1908
Mt. Gilead.....	George H. Pugh, M.D.....	Jan. 10, 1906	Jan. 25, 1906	1907
Mt. Healthy.....	Lafayette Neufarth, M.D.....	Jan. 16, 1906	Jan. 22, 1906	1907
Mt. Orab.....	Wm. E. Bingaman.....	Jan. 8, 1906	Jan. 23, 1906	1907
Mt. Sterling.....	Robert Leach, M.D.....	Jan. 5, 1906	Feb. 10, 1906	1907
Mt. Washington.....	Wm. C. Langdon, M.D.....	Feb. 9, 1905	Feb. 13, 1905	1907
Nashville.....	David Parks.....	Jan. —, 1906	Jan. 12, 1906	1907
Nevada.....	H. E. Dwire, M.D.....	Aug. 21, 1905	Aug. 23, 1905	1908
New Alexandria.....	C. E. Gourley, M.D.....	Mar. 26, 1906	Apr. 5, 1906	1912
New Bloomington (Agosta P. O.).....	W. H. Carey.....	Feb. 5, 1906	Feb. 16, 1906	1908
New Bremen.....	Edward M. Phelps, M.D.....	May 2, 1905	May 22, 1905	1907
New Carlisle.....	V. B. Littleton.....	Jan. 15, 1906	Jan. 17, 1906	1907
New Concord.....	Henry McCreary, M. D.....	May 11, 1904	July 13, 1904	1908
New Holland.....	W. R. Gordon.....	Jan. —, 1906	Apr. 16, 1906	1907

*Appointed by the State Board of Health.

HEALTH OFFICERS APPOINTED BY COUNCIL, ETC.—Continued.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
New Lebanon (Potsdam P. O)	D. W. Shellabarger, M.D.	Oct. 2, 1905	Oct. 16, 1905	1907
New Lebanon (Montgomery Co.)	Lutie Piatt	Mar. 3, 1904	Jan. 14, 1905	1907
New Lexington	John W. Holden	July 10, 1905	Sept. 12, 1905	1907
New Madison	Wm. B. Harter	Jan. 15, 1906	Jan. 17, 1906	1907
New Matamoras	J. R. Johnson	Apr. 2, 1906	May 9, 1906	1907
New Paris	G. L. Lyne, M.D.	Feb. 5, 1906	Feb. 10, 1906	1907
New Riegel	Anthony Imber	Jan. 6, 1906	Jan. 17, 1906	1907
New Salem	Geo. A. Basore	Apr. 2, 1906	Apr. 11, 1906	1907
New Straitsville	James C. Duffy	Feb. 5, 1906	Feb. 16, 1906	1907
Newton Falls	H. M. Mealy, M.D.	Sept. 3, 1902	Jan. 28, 1903	1907
Newtown	Thomas B. Mulloy, M.D.	Feb. 13, 1905	Mar. 3, 1905	1907
New Vienna	G. R. Conard, M.D.	June 26, 1905	July 20, 1905	1907
New Washington	George Whiteum	Feb. 8, 1905	Mar. 3, 1905	1907
New Waterford	C. B. Williams	Apr. 2, 1906	Apr. 11, 1906	1907
New Weston	A. Pearson, M.D.	Aug. 15, 1905	Aug. 18, 1905	1907
Ney	P. M. Lehman	Jan. 22, 1906	Jan. 27, 1906	1907
North Amherst	Washington Foster, M.D.	May 16, 1905	June 9, 1905	1907
North Bend	Thomas Pearson	Jan. 29, 1906	Feb. 10, 1906	1907
North Robinson	James E. Morton	Mar. 13, 1905	Apr. 10, 1905	1908
Oakwood	Martin Shisler	Jan. —, 1906	Jan. 24, 1906	1907
Orangeville	Ralph R. Root M.D.	June 24, 1903	Oct. 9, 1903	1909
Osborn	Ora Beakler	Jan. 8, 1906	Jan. 31, 1906	1907
Osgood	W. F. Davidson	Jan. 16, 1906	Jan. 27, 1906	1907
Osnaburg	W. D. Davis, M.D.	Jan. 31, 1906	Feb. 6, 1906	1907
Ostrander	G. E. Cowles, M. D.	Mar. 19, 1906	May 2, 1906	1907
Ottoville	John F. Ockuly, M.D.	Jan. —, 1906	Jan. 10, 1906	1907
Oxford	Wm. E. Calohan	Mar. 7, 1905	Mar. 15, 1905	1907
Palestine	W. E. Kester	Jan. 15, 1906	Jan. 27, 1906	1907
Payne	George W. Bodey, M.D.	Jan. 15, 1906	Feb. 10, 1906	1907
Peebles	G. F. Thomas M.D.	Feb. 5, 1906	Feb. 8, 1906	1907
Pickerington	Douglas Phillips	Jan. 15, 1906	Jan. 31, 1906	1907
Pioneer	Arthur F. Norris	Jan. 9, 1906	Jan. 17, 1906	1907
Plain City	Oran Long	Feb. 5, 1906	Feb. 10, 1906	1907
Plainfield	Wesley Lawrence	Sept. 4, 1905	Sept. 8, 1905	1908
Pleasant City	J. W. Trott	Sept. 4, 1905	Sept. 23, 1905	1907
Pleasant Ridge	Chas. W. Acomb	May 20, 1905	June 24, 1905	1907
Pleasantville	M. B. McCleery	Feb. 5, 1906	Feb. 8, 1906	1907
Plymouth	George J. Searle, M.D.	Feb. 1, 1906	Feb. 6, 1906	1907
Pomeroy	Clarence A. Ihle, M.D.	Jan. 2, 1906	Jan. 31, 1906	1907
Portage	Elmer D. Quaintance	Nov. 20, 1905	Dec. 4, 1905	1907
Port Jefferson	D. J. Cargill, M.D.	Oct. 2, 1905	Oct. 17, 1905	1907
Potsdam P. O.	(See New Lebanon.)			
Prairie Depot P. O. .	(See Freeport.)			
Quincy	S. W. Simmons, M.D.	Jan. 9, 1906	Jan. 17, 1906	1907
Racine	John Philson, M.D.	Jan. 15, 1906	Feb. 3, 1906	1907
Rarden	Grafton Windle	Oct. 9, 1905	Oct. 21, 1905	1907
Rendville	H. S. Cozad, M.D.	July 18, 1905	Sept. 27, 1905	1907
Reynoldsburg	B. F. Orem	Mar. 24, 1905	Mar. 28, 1905	1907
Ripley	A. W. Francis, M.D.	Jan. 17, 1906	Jan. 24, 1906	1907
Rochester	Jno. T. Henderson, M.D.	Mar. 6, 1905	Apr. 19, 1905	1908
Rock Creek	B. C. Carpenter	Jan. 9, 1906	Jan. 25, 1906	1907
Rockport (WestPark P.O., Kamm's P.O.)	*Chas. L. Wood, M.D.	Mar. 7, 1905	Mar. 27, 1905	1907
Rocky Ridge	John Krehmke	Feb. 26, 1906	Mar. 26, 1906	1908

*Address Lakewood

HEALTH OFFICERS APPOINTED BY COUNCIL, ETC.—Continued.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
Rocky River.....	*Chas. L. Wood, M.D. . .	Feb. 16, 1906	Mar. 16, 1906	1907
Rogers	D. M. Miller.....	May 7, 1906	May 16, 1906	1907
Roscoe	J. S. Reed	Feb. 21, 1905	Mar. 22, 1905	1907
Roseville.....	T. C. Hilliard	Jan. 15, 1906	Jan. 27, 1906	1907
Rossburg P. O.....	(See Rossville.)			
Rossville.....	D. H. Brown.....	Mar. 24, 1906	Mar. 26, 1906	1907
Rushville.....	W. C. Lewis, M.D.....	May 1, 1905	June 12, 1905	1907
Sabina.....	S. B. Lightner, M.D.....	June 5, 1905	June 13, 1905	1907
St. Bernard.....	Jacob W. Thiel, M.D....	May 15, 1905	May 31, 1905	1907
St. Clairsville.....	Samuel L. West, M.D....	May 1, 1905	May 8, 1905	1908
St. Johns	E. L. Blank.....	Jan. —, 1906	Jan. 9, 1906	1907
St. Paris	C. A. Offenbacher, M.D..	Apr. 12, 1905	May 5, 1905	1907
Salesville	Wm. T. Carpenter.....	June 6, 1905	June 24, 1905	1907
Salineville.....	H. M. Calvin, M.D.....	Jan. —, 1906	Jan. 9, 1906	1907
Sarahsville.....	Eli H. Bates.....	Mar. 23, 1905	Apr. 13, 1905	1907
Savannah.....	Timothy Stinebring.....	June 5, 1905	Aug. 2, 1905	1908
Scott	William Keltner.....	Feb. 14, 1906	Feb. 28, 1906	1907
Sekitan P. O.	(See Addyston.)			
Senecaville.....	Richard Lowry.....	Apr. 17, 1905	June 7, 1905	1907
Seven Mile.....	C. B. Wilson	Jan. 29, 1906	Mar. 26, 1906	1907
Shanesville.....	John Jordan	Feb. 5, 1906	Mar. 9, 1906	1907
Shawnee.....	David T. Harris	Jan. 2, 1906	Jan. 27, 1906	1907
Shreve.....	John C. Mauson.....	Feb. 6, 1906	May 16, 1906	1907
Silverton.....	Dr. A. A. Sprague	Jan. 18, 1906	Jan. 31, 1906	1907
Sinking Springs.....	John W. Hite.....	Apr. 2, 1906	Apr. 11, 1906	1907
Smithville.....	W. G. Zimmerman, V.S..	Apr. 11, 1904	Apr. 27, 1904	1907
Somerville.....	Frank Chapin.....	Jan. 16, 1906	Jan. 22, 1906	1907
South Charleston ..	Jason Mercer.....	Jan. 23, 1906	Jan. 31, 1906	1907
South Point.....	C. Wayne McCoy, M.D....	Jan. 18, 1906	Jan. 31, 1906	1907
South Webster.....	S. S. Ferguson.....	Feb. 5, 1906	Apr. 11, 1906	1907
South Zanesville.....	Noah O. Wirick.....	Feb. 13, 1906	Mar. 26, 1906	1907
Spring Hills.....	Oliver H. Eby.....	Apr. 26, 1905	May 12, 1905	1907
Spring Valley.....	S. E. Dyke, M.D.....	May 26, 1905	May 29, 1905	1907
Stockport.....	T. J. Lyne, M.D.....	Mar. 6, 1905	Apr. 13, 1905	1907
Struthers.....	Arthur L. Jones.....	May 17, 1905	July 20, 1905	1907
Stryker.....	John E. Meek.....	July 31, 1905	Oct. 16, 1905	1909
Sugar Grove.....	E. R. Brown, M.D.....	Jan. 15, 1906	Feb. 16, 1906	1907
Sycamore.....	Isaiah B. Gibbs, M.D....	Jan. 21, 1906	Mar. 9, 1906	1907
Sylvania.....	A. E. Stow.....	May 6, 1905	May 22, 1905	1907
Tarleton.....	W. A. Leist.....	Mar. 7, 1904	Apr. 1, 1904	1907
Thornville.....	O. J. Stevens.....	Feb. 5, 1906	Feb. 16, 1906	1907
Tiltonsville P. O....	(See Grover.)			
Tontogany.....	T. A. Bickerstaph, M.D..	Feb. 23, 1904	Mar. 9, 1904	1907
Toronto.....	John Wellington, Sr....	Aug. 15, 1905	Aug. 18, 1905	1907
Trimble.....	Arthur W. Dean.....	June 13, 1904	June 29, 1904	1907
Trotwood.....	Jesse C. Minnich.....	May 12, 1905	May 31, 1905	1907
Tuscarawas.....	John W. Wood.....	Nov. 28, 1905	Dec. 7, 1905	1908
Unionville Center...	Chas. O. McCune, M.D....	Sept. 12, 1904	Sept. 23, 1904	1907
Uniopolis.....	J. W. Logan	Jan. 16, 1906	Jan. 17, 1906	1907
Upper Sandusky....	G. O. Maskey, M.D.....	Feb. 6, 1905	July 11, 1905	1907
Vandalia.....	W. H. Riley, M.D.....	Jan. 15, 1906	Feb. 8, 1906	1907
Vinton.....	William McMillin.....	May 9, 1904	May 25, 1904	
Washingtonville....	C. E. Holt	Jan. 2, 1906	Jan. 27, 1906	1907
Wellington.....	R. G. Holland, M.D.....	Feb. 5, 1906	Feb. 23, 1906	1908
West Alexandria....	John P. Stock.....	Feb. 5, 1906	Feb. 10, 1906	1908
West Carrollton.....	Frank E. Hinkson.....	Jan. 17, 1905	Jan. 26, 1905	1906

*Address Lakewood.

HEALTH OFFICERS APPOINTED BY COUNCIL, ETC.—Concluded.

Village.	Name.	Appointed.	Approved.	Term expires 1st Mon. in Jan.
West Farmington...	F. W. Ogram.....	Aug. 1, 1905	Aug. 10, 1905	1907
West Liberty.....	A. C. Brindle, M.D.....	Jan. 12, 1906	Jan. 17, 1906	1907
West Manchester...	Carsey Rentfrow.....	Jan. 15, 1906	Feb. 10, 1906	1908
West Mansfield.....	H. A. Skidmore, M.D. ..	May 15, 1905	May 22, 1905	1907
West Park P. O. ...	(See Rockport.)			
West Salem.....	J. W. Ferguson, M.D....	Jan. 16, 1906	Feb. 10, 1906	1907
West Unity.....	Joseph Fisher.....	July 6, 1905	July 17, 1905	1908
Whitehouse.....	John F. Lehman.....	May 5, 1904	Sept. 6, 1904	1907
Williamsburg.....	G. L. Hines, M.D.....	May 29, 1905	June 7, 1905	1907
Willshire.....	C. W. Bobo, M.D.....	Jan. 15, 1906	Jan. 17, 1906	1907
Winchester.....	C. S. Corboy, M.D.....	Jan. 2, 1906	Jan. 31, 1906	1907
Worthington.....	Charles E. Wilson.....	May 8, 1906	May 16, 1906	1908
Wren.....	P. G. Havice, M.D.....	Jan. 16, 1905	Feb. 23, 1906	1907
Yorkshire.....	Alva Finkbone.....	Jan. 15, 1906	Jan. 22, 1906	1907
Zanesfield.....	O. H. McDonald M.D....	Feb. 5, 1906	Feb. 8, 1906	1907
Zoar.....	Frank Ackerman.....	Jan. 31, 1906	Feb. 1, 1906	1907
Lakeside.....	O.L.Mapes,M.D. (special)	For the sea- son of 1905		

HEALTH OFFICERS OF CITIES AND VILLAGES.

Place.	Health Officer.
Aberdeen	Dr. S. A. Laughlin.
Ada	W. H. Morrow.
*Adamsville	Geo. W. McDowell
*Addyston	Dr. J. H. Haire.
Adelphi	W. S. Koch.
*Agosta P. O. (New Bloomington) ..	W. H. Carey.
Akron	Dr. A. A. Kohler
Albany	Dr. A. F. Holmes.
Alexandria	
Alger	Dr. U. P. L. Vermillion.
Alliance	Dr. J. C. Temple.
Alvordton	Dr. T. E. Schrider.
Amanda	Geo. Boerstler.
*Amelia	Charles Coleman.
Amesville	J. C. Suedeker.
Andover	Dr. F. L. Sargent.
*Anna	Dr. D. R. Milliette.
*Ansonia	Dr. C. I. Stephen.
*Antioch	Dr. D. W. Lowe.
*Antwerp	Andrew J. Schillb.
*Apple Creek	Dr. Joseph K. King.
*Arcadia	W. W. Moore.
Arcanum	James Wallace.
Archbold	August Ruibley.
Arlington	Solomon Bates.
*Arlington Heights	H. R. Veddern
Arnettsville (Pittsburg P. O.)	Dr. J. O. Starr.
*Ashland	E. A. Kauffman.
*Ashley	Rodman Welch.
Ashtabula	Dr. A. W. Hopkins
Ashville	John Johnson.
*Athalia	Charles F. Clark.
Athens	Dr. J. M. Higgins.
*Attica	Dr. C. A. Force.
Avon	Dr. John R. Pipes.
*Bainbridge	Dr. R. H. McKee.
*Bairdstown	A. W. Solomon.
Baltimore	L. K. Davis.
*Barberton	Dr. Bert Rodenbaugh.
Barnesville	W. T. Evans.
Barnhill	John Stevenson.
Batavia	C. H. Crane.
Batesville	George Lashley.
Beach City	Theodore F. Stamm.
Beallsville	A. G. Harper.
*Beaver	Dr. E. B. Schrock.

*In lieu of board of health.

Place.	Health Officer.
Beaver Dam	Dr. J. B. Haines.
Bedford	Thos. E. Matheus.
Bellaire	Dr. D. W. Boone.
Bellbrook	R. M. Martz.
Belle Center.....	J. T. Ewing.
Bellefontaine	Dr. J. S. Deemy.
*Belle Valley	C. E. Henry.
Belleville	Dr. J. W. Kelly.
Bellevue	Charles Bilger.
*Belmont	H. O. Gatten.
Belmore	Dr. G. B. Adrian.
Beloit	R. H. Oswalt.
Belpre	Jesse McGrew.
Benton Ridge	Dr. R. D. Whisler.
Berea	T. L. McKean, Clerk.
*Berlin X Roads	Henry Davis.
*Berlin Heights	Dr. G. W. Hine.
*Berne P. O. (Carlisle).....	W. R. Bromhall.
*Bethel	Dr. W. E. Thompson.
*Bettsville	C. G. Norton.
Beverly	Geo. A. Radenbach.
*Blakeslee	Jas. B. Lauchlin.
*Blanchester	U. B. Chambers.
Bloom Center	Dr. O. C. Wilson.
*Bloomdale	G. W. Urie.
Bloomfield (See Bloomingdale P. O.)	
*Bloomingburg	H. W. Worrell
Bloomington P. O. (Bloomfield)...	E. R. Blackburn, Clerk.
Bloomville	Dr. T. C. Loose.
Bluffton	Dr. John J. Sutter.
*Bolivar	Conrad H. Lebold.
Boston (See Owensville P. O.)....	
*Botkins	Jacob Zaenglein.
Bourneville	Dr. J. A. VanWinkle.
*Bowerston	Joseph Penn.
*Bowersville	J. E. Steward.
Bowling Green	John Troxel.
*Bradner	O. J. Mitchell.
*Bradford	H. J. McKinney.
*Bratenahl (P. O. Cleveland).....	J. G. Newkirk.
*Bremen	Dr. F. P. Strayer.
*Bridgeport	Dr. W. M. Oates.
Brilliant	A. McIntire.
*Brinkhaven P. O. (Gann)	David C. Cunningham.
Brooklyn P. O. (South Brooklyn)...	R. E. Stickney.
*Brooklyn Heights	Joseph E. Richardson.
Brookville	Dr. H. W. McMillen.
*Broughton	J. L. Boroff.
Bryan	August Heidley.
Buchtel	Dr. A. P. Lee.
Buckeye City	F. M. Welker.
Buckland	L. R. W. Sharp.

*In lieu of board of health.

Place.	Health Officer.
Bucyrus	Dr. A. H. McCrory.
Buffalo Hamlet	L. F. Dudley.
*Burbank	A. W. Hoffman.
Burkettsville	Dr. B. G. Inman.
Burton	Dr. A. D. Warner.
*Butler	Wm. W. Thuma.
*Butlerville	John R. Hitesman.
*Byesville	John W. Geary.
*Cadiz	William H. Lemmon.
Calais	J. R. Johnson.
*Caldwell	Dr. J. L. Gray.
Caledonia	Noah Lee.
Cambridge	T. C. Stanley.
*Camden	Dr. W. E. Pryor.
Canal Dover	Herman F. Eppens.
Canal Fulton	Jeremiah L. O'Connor.
*Canal Winchester	J. W. Shook.
Canfield	A. D. Woods.
*Cannelville (See Dillons P. O.)....	R. T. Homman.
Canton	Dr. A. V. Smith.
*Cardington	Dr. W. A. Smith.
*Carey	Joseph F. Wonder.
Carlisle (See Berne P. O.).....	
Carroll	Dr. H. A. Brown.
Carrollton	Dr. A. H. Hise.
*Carthage	Samuel B. Gilchrist.
*Casstown	Dr. W. W. Baker.
Catawba	Dr. J. D. Thomas.
*Cecil	C. W. Boland.
Cedarville	Arthur McFarland.
Celina	Dr. Joseph Sager.
Centerburg	L. B. Evans.
*Centerville	Dr. B. W. Dudley Kever.
Centerville (See Thurman P. O.)..	
*Chagrin Falls	D. A. Groves.
*Chambersburg (Eureka P. O.)....	Dr. W. J. Fletcher.
*Chardon	Harvey L. Williams.
*Chatfield	Samuel Lutz.
*Chester Hill	William Johnson.
Chesterville	Dr. W. C. Hodges.
*Cheviot	Charles Craig.
Chicago Junction	Dr. A. R. Kauffman.
Chickasaw	H. S. Schaefer.
Chillicothe	Dr. W. S. Scott.
Cincinnati	Dr. Samuel E. Allen.
Circleville	James I. Egan.
Clarington	C. T. Reilly.
*Clarksburg	Floyd Parker.
*Clarksville	
Cleveland	Dr. Martin Friedrich.
*Cleveland Heights (Hamlet)	Dr. W. E. Shackleton.
*Cleves	Dr. W. C. Hughes.

*In lieu of board of health.

Place.	Health Officer.
Clifton	Dr. J. H. Harris.
Clinton (See Fitchville P. O.).....	
Clyde	F. G. Tuttle.
Coal Grove	Dr. W. M. Shattuck.
*Coalton	J. C. Duncan.
Coldwater	Dr. C. F. Bollman.
*College Corner	J. Emery Paxton
College Hill	J. E. Deininger.
Collinwood	Dr. C. W. McClenchan.
Columbiana	J. D. Holloway.
Columbus	Dr. McKendree Smith.
*Columbus Grove	J. F. Bogart.
*Commercial Point	John Chenault.
Congress	Dr. Geo. C. Essick.
Conneaut	Dr. O. N. Warner.
*Continental	W. J. Conklin.
Convoy	Dr. C. D. Sidle.
Coolville	Dr. A. M. Frame.
Copley	O. E. Arnold.
*Corning	William Anderson.
Cortland	Dr. B. G. McCurley.
*Corwin	Jacob I. Clark.
Coshocton	W. B. Miller.
Covington	Wm. E. Westfall.
Crestline	Dr. C. A. Marquart.
*Creston	Charles A. Mellen.
Cridersville	F. L. Newcomer.
Crooksville	F. G. Albee.
*Croton P. O. (Hartford).....	Dr. C. B. Hempstead.
*Crown City	J. V. Stevers.
*Cumberland	J. T. Aiken.
*Custar	H. Mannhardt
*Cuyahoga Falls	W. W. Scupholm.
Cygnets	Thomas O. Flickel.
*Dalton	Dr. I. Coloman Hancy.
Danville	Dr. T. E. Jefferson.
Darbyville	M. N. Bowman.
Dayton	Dr. Frank W. Murphy.
Deavertown	Theodore Welch.
Deerfield (See So. Lebanon P. O.)..	
Deersville	Dr. Frank James.
Defiance	Dr. J. D. Westrick.
*DeGraff	John W. Hendershott.
Delaware	Dr. O. W. Bonner.
Delhi	M. F. Andrew.
*Dell Roy	S. W. Snee
*Delphos	Dr. Ezra Burnett
Delta	Dr. William Ramsey.
Dennison	Dr. L. H. Hughes.
*Deshler	Isaac Collier.
*Dexter City	Dr. E. E. Coborn.
*Dillons P. O. (Cannellville).....	R. T. Homman.

*In lieu of board of health.

Place.	Health Officer.
Dillonville	Dr. M. D. Barkhurst.
Donnelsville	Dr. Horace Heistand.
*Doylestown	Frank DeNise
Dresden	C. W. Carter.
*Dublin	Fay Eberly.
*Dunkirk	Dr. C. C. McLaughlin.
*Dupont	C. L. Speck.
East Cleveland	J. H. Stamberger.
East Fairfield	Dr. G. H. Albright.
East Liverpool	Dr. C. B. Ogden.
East Palestine	L. Neville.
*East Springfield	Dr. H. L. Fiscus.
*Eaton	Geo. W. Jones.
Edgerton	Dr. C. Hathaway.
*Edison	Dr. John H. Jackson.
Edon	H. F. Alwood.
Eldorado	Geo. W. McCoy.
Elgin	Dr. L. P. Jackson.
Elida	Dr. S. A. Hitchcock.
*Elmore	Dr. R. A. Willett.
Elmwood Place	Dr. E. T. Busching.
Elyria	Dr. George E. French.
Empire	John Hunter.
Euon	Frank Pappert.
*Eucha	P. J. Cooney.
*Eureka P. O. (Chambersburg)	Dr. W. J. Fletcher.
Fairfield	Z. T. Hebble.
Fairmount (Hamlet)	L. Hunter, Clerk.
*Fairport	J. H. Werbeach.
Fairview	C. M. Ault.
*Farmersville	Henry P. Oudfather.
Fayette	Benjamin Stoner.
*Fayetteville	Dr. F. A. Johnson.
*Felicity	Charles N. Crawford.
*Fernbank	James E. Hickman
Findlay	Amos Beardsley.
Fitchville P. O. (Clinton)	S. M. Sly.
Fletcher	Dr. J. B. Barker.
Florida	William Thompson.
*Flushing	George Wheeler.
Forest	John Handchy.
Fort Jennings	Dr. J. E. Stephan.
Fort Recovery	J. M. Buchanan.
Fostoria	W. N. Caldwell.
*Frankfort	L. N. Matteson.
Franklin	John B. Miller.
*Frazeysburg	John W. Blizzard
Fredericksburg	Dr. J. F. Long.
Fredericktown	Thomas Burke.
*Freeport	Stewart Ferrell.
Freeport (See Prairie Depot P. O.).	
Fremont	Dr. O. C. Vermilya.

*In lieu of board of health.

Place.	Health Officer.
Fultonham P. O. (Uniontown).....	Dr. C. Z. Axline.
Gahanna	D. L. Stygler.
Galion	Dr. H. H. Hartman.
Gallipolis	Chas. B. Robinson.
Gambier	Dr. A. D. Welker.
Gann (Brinkhaven P. O.).....	
*Garrettsville	Dr. Geo. R. French.
Geneva	Dr. F. C. Smith.
*Genoa	George W. Wright.
*Georgetown	Samuel F. Walker.
Germantown	Samuel A. Bausman.
*Gettysburg	Dr. John Emerson Monger.
*Geyer	Thomas H. Irwin.
Gibsonburg	J. P. Tierney.
Gilboa	Dr. Bruce Snodgrass.
Girard	Dr. W. S. Thompson.
Glandorf	Dr. H. M. Northam.
*Glendale	Clifford Allen.
Glenmont	A. L. Jones.
*Glouster	David Dille.
Gnadenhutten	L. S. Winsch.
Good Hope	D. C. Somers.
*Gordon	H. Z. Silver.
*Grafton	John Cahill.
*Grand Rapids	L. L. Mowan.
Grand River P. O. (Richmond)....	H. S. Barton.
Granville	W. E. Clemens, V. S.
Gratis P. O. (Winchester)	Fred. Boesenberg.
Graysville	W. E. Barker.
*Green Camp	G. W. Collins.
*Greenfield	C. S. Clouser.
Green Spring	Dr. R. D. Reynolds.
Greenville	Dr. Geo. W. Burnett.
Greenwich	Wilber Holden.
*Grove City	J. Wm. Benjamin.
Groveport	Dr. C. R. Clement.
Grover (See Tiltonville P. O.).....	
*Grover Hill	G. W. Morris.
Hamden Junction	E. E. Howe.
Hamersville	
Hamilton	Dr. Mark Millikin.
Hamler	Geo. Bell.
Hanging Rock	C. C. Farmer.
*Hanover	Dr. D. O. Roberts.
Hanoverton	Newton Stuller.
*Harrisburg	Mason Sealock.
Harrison	Abe Loos.
Harrisville	W. C. Toland, Mayor.
*Harrod	John Blair, Sr.
*Hartford (See Croton P. O.).....	Dr. C. B. Hempstead.
Hartwell	H. G. Gould.
*Harveysburg	Dr. Samuel Jasper Ellison.

*In lieu of board of health.

Place.	Health Officer.
Haskins	William H. North.
*Haviland	George Sharp.
Hayesville	Dill Andress.
*Hebron	Dr. O. M. Kramer.
Hemlock	Dr. R. W. Miller.
Herring P. O. (Lafayette)	Dr. N. Sager, Jr.
Hicksville	Amos Forlow.
*Higginsport	F. M. Cahill.
Highland P. O. (New Lexington) ..	
*Hilliards	Dr. C. S. Latham.
Hillsboro	Dr. J. D. McBride.
Hiram	Dr. F. H. Hurd.
Holgate	W. S. Smith.
*Hollansburgh	Dr. A. W. Meek.
Holmesville	C. W. McClelland.
Home City	Dr. B. F. Lehman.
*Hopedale	Dr. Elmer T. Kuhn.
Hoytville	Simon Brentlinger.
Hubbard	Dr. W. S. Bond.
Hudson	Dr. H. C. Coolman.
*Huntsville	Dr. G. W. Jones.
*Huron	Robert Day.
*Irondale	Albert Culp.
Ironton	Dr. E. E. Wells.
Ithaca	Dr. J. C. Hamilton.
Jackson	Wm. H. Schillenger, M. D.
Jacksonboro	John Stamm.
*Jackson Center	Dr. A. V. Derr.
Jacksonville	Dr. C. VonScheele.
Jamestown	W. F. McMillen.
*Jefferson	W. S. Andrews.
*Jeffersonville	Wm. Reid.
Jenera	C. H. Heldman.
*Jeromeville	George Schroll.
Jerry City	Austin VanBlarcum.
Jerusalem	J. A. Latham.
*Jewett	John Wesley Lucas.
Johnsonville	E. C. Hitchcock.
Johnstown	Dr. J. N. Wright.
*Junction City	Dr. F. J. Crosbie.
*Kalida	Henry Recker.
Kelleys Island	Geo. P. Schardt.
Kennedy Heights	
Kennedy P. O. (Kennedy Heights) ..	
Kent	James Armstrong.
Kenton	John M. Ellis.
*Kettleville	Dr. O. O. Lemaster.
Killbuck	Dr. Emii J. Heinig.
Kimbolton	F. M. Fowler.
Kingston	A. L. Hatcher.
Kirby	Dr. E. E. Burns.
*Kossuth	William Earhart.

*In lieu of board of health.

Place.	Health Officer.
Lafayette (See Herring P. O.)....	
LaGrange	Dr. J. W. Lindsey.
Lakeside	Dr. O. L. Mapes.
*Lakeview	E. D. Carr.
Lakewood	Dr. A. E. McClure.
Lancaster	Dr. Geo. W. O'Grady.
*Larue	G. A. L. Markwith.
Latty	Robert Higginbotham.
*Laura	Charles O. Hall.
Laurelville	Dr. W. D. Cain.
Lebanon	Dr. A. W. Mardis.
Leesburg (See Leesville P. O.)....	
Leesburg	Dr. R. E. Holmes.
*Leesville P. O.	A. R. Morrison.
Leetonia	Dr. S. R. McCready.
Leipsic	Dr. John C. McClung.
Lewisburg	A. N. Cox.
Lewisville	V. E. Dillon.
*Lexington	Dr. J. P. Stober.
Liberty Center	D. K. Bowker.
Lima	Dr. A. L. Jones.
*Limaville	O. P. Sebrell.
*Lindsey	Dr. Wm. E. Higbie.
*Lisbon	David H. Fells.
*Lithopolis	Felix N. Taes.
*Lockbourne	Leon Harrison.
Lockington	Dr. J. Robert Caywood, Clerk.
*Lockland	Peter Butchart.
*Lodi	Henry Selders.
Logan	Dr. M. H. Cherrington.
*London	Dr. W. H. Christopher.
Lorain	Dr. Edward V. Hug.
Loramie	Dr. Thomas Walkup.
*Lore City	Joseph Todd.
Loudonville	Walter S. Young.
Louisville	Dr. R. G. Walker.
*Loveland	Dr. F. H. Lever.
Lowell	A. J. Thompson.
Lowellville	J. H. McWilliams.
Lower Salem	J. P. Hartshorn.
*Lucas	William Baer.
Lynchburg	M. V. Nolder.
*Lyons	Dr. Thomas Blair.
*McArthur	Geo. W. Partlow.
McClure	E. E. Britton.
*McComb	Scott W. Preble.
McConnelsville	William Dille.
McGuffey	Dr. J. B. K. Evans.
Macedonia	P. B. Seacoy.
*Macksburg	O. S. Gilchriest.
*Madison	Dr. C. H. Quayle.
Madisonville	Dr. C. L. Metz.

*In lieu of board of health.

Place.	Health Officer.
Magnetic Springs	Dr. M. B. Newhouse.
Magnolia	Charles Kemp.
*Maineville	J. G. Trimble.
Malinta	G. C. Bachtal.
Malta	W. R. Scott.
Malvern	Dr. John A. Rhiel.
Manchester	Dr. R. A. Stephenson.
Mansfield	Dr. John M. Burns.
Mantua	C. R. Chapin.
Marblehead	L. M. Clemons.
*Marengo	I. E. Eakins.
Marietta	Dr. F. S. McGee.
Marion	James P. Lutz.
Marseilles	Dr. E. S. Jones.
*Marshallville	E. P. Willford.
*Martinsburg	Dr. N. S. Toland.
Martins Ferry	Dr. John Johns.
Martinsville	John T. Crawford.
*Marysville	Dr. C. W. Hoopes.
Mason	Dr. C. T. Hall.
Massillon	Dr. T. Clarke Miller.
*Maumee	Philip Hartman.
Mechanicsburg	Dr. J. C. Hathaway.
*Medina	F. L. Harding.
*Melrose	T. J. Myers.
*Mendon	Charles B. Harbour, M. D.
*Mentor	Dr. J. W. Lowe.
Metamora	Augustus Reis.
Miamisburg	Dr. A. H. Blossom.
Middleburg	C. C. Heath.
Middle Point	J. R. Swaney.
Middleport	Dr. David Sisson.
Middletown	Dr. Geo. D. Lummis.
Midland (See Midland City P. O.) ..	
Midland City P. O. (Midland)	Dr. Leonidas Boulware.
Midway (See Sedalia)	
*Mifflin	Dr. Jas. H. S. Hutchison.
*Milan	Geo. W. Curtis.
*Milford	Dr. Con W. Gatch.
*Milford Centre	Martin Frye.
Millbury	Dr. C. M. Diebert.
Milledgeville	Dr. W. T. Mathews.
Milder City	F. M. Miley.
Millersburg	Charles A. Estill.
Milton Center	Dr. J. F. Noble.
*Miltonsburg	Dr. Chas. Keyser.
Mineral City	C. C. White.
Mineral Ridge	Dr. J. M. Elder.
*Minerva	Elmer E. Fultz.
*Mingo Junction	Dr. W. W. McMillan.
*Minster	C. H. Dickman.
Mogadore	

*In lieu of board of health.

Place.	Health Officer.
Monroeville	Dr. E. R. Kreider.
*Montezuma	George Stafford.
Montpelier	Dr. J. V. Lesnet.
*Morristown	A. M. Poole.
Morrow	A. J. Koeble.
Moscow	Dr. W. S. Purkhiser.
Mt. Airy	
Mt. Blanchard	S. E. Moore.
Mt. Cory	Jacob Doty.
Mt. Eaton	
*Mt. Gilead	Dr. G. H. Pugh.
*Mt. Healthy	Dr. Lafayette Neufarth.
*Mt. Orab	Wm. E. Bingaman.
Mt. Pleasant	Henry B. Mercer.
*Mt. Sterling	Dr. Robert Leach.
Mt. Vernon	Dr. H. W. Blair.
Mt. Victory	Dr. B. B. Morrow.
*Mt. Washington	Dr. W. C. Langdon.
Murray City	Dr. T. J. Dillenger.
Mutual	C. M. Goul.
Napoleon	D. H. Hancock.
*Nashville	David Parks.
Navarre	John Bailiss.
Nelsonville	Dr. N. Hill.
*Nevada	Dr. H. E. Dwire.
Neville	F. M. Neal.
New Albany	Christopher Horlocker.
*New Alexandria	Dr. C. E. Gourley.
Newark	Dr. Clark B. Hatch.
New Athens	Dr. Albert Dickerson.
*New Bloomington (See Agosta P.O.)	
New Boston	
*New Bremen	Dr. E. M. Phelps.
Newburgh	Dr. C. L. McCoy.
Newburg Heights (See Willow P.O.)	
*New Carlisle	V. B. Littleton.
Newcomerstown	Wm. Tidrick.
*New Concord	Dr. Henry McCreary.
*New Holland	W. R. Gordon.
New Knoxville	Dr. H. E. Fledderjohann.
*New Lebanon (See Potsdam P. O.)	
*New Lebanon, Montgomery Co.	Lutie Piatt.
New Lexington (See Highland P. O.)	
*New Lexington	J. W. Holden.
New London	A. M. Turner.
*New Madison	Wm. B. Harter.
*New Matamoras	J. R. Johnson.
*New Paris	Dr. G. L. Lyne.
New Philadelphia	Dr. Geo. H. Peck.
New Richmond	Dr. J. A. Windsor.
*New Riegel	Anthony Imber.
*New Salem	George A. Basore.

*In lieu of board of health.

Place.	Health Officer.
*New Straitsville	James C. Duffy.
*Newtown	Dr. Thomas B. Mulloy.
*Newton Falls	Dr. H. H. Mealey.
*New Vienna	Dr. Geo. R. Conard.
*New Washington	George Whitcum.
*New Waterford	C. B. Williams.
*New Weston	Dr. A. Pearson.
*Ney	Dr. P. M. Lehman.
Niles	Dr. H. S. Brown.
*North Amherst	Dr. Washington Foster.
North Baltimore	Dr. J. W. Stoner.
*North Bend	Thomas Pearson.
North Lewisburg	G. L. Freeman.
North Lindale	Hugh Geariety.
*North Robinson	James E. Morton.
Norwalk	Dr. Edgar Martin.
Norwich	L. D. Wilson.
Norwood	Dr. J. C. Cadwallader.
Nottingham	Dr. W. O. Jenks.
Oak Harbor	Dr. S. D. Allen.
Oak Hill	Wm. Jenkins.
Oakley	C. C. Nebel.
*Oakwood	Martin Shisler.
Oberlin	E. L. Burge.
Ohio City	G. A. Balliet.
Olmsted Falls	H. B. Northrop.
*Orangeville	Dr. R. R. Root.
Orville	Dr. A. A. Brooks.
*Osborn	Ora Beakler.
*Osgood	Wm. F. Davidson.
*Osnaburg	Dr. W. D. Davis.
*Ostrander	Dr. G. E. Cowles.
Ottawa	Dr. Frank Light.
*Ottoville	Dr. John F. Ockuly.
Otway	Simon Crow.
Owensville P. O. (Boston)	G. G. Rutledge.
*Oxford	W. E. Calohan.
Painesville	S. A. Haskell.
*Palestine	W. E. Kester.
Pancoastburg P. O. (Waterloo)	
Pandora	Dr. E. A. Ballmer.
Pataskala	Frank McConnaughey.
Patterson	Peter C. Breidenbach.
Paulding	Dr. Ira J. Dix.
*Payne	Dr. G. W. Bodey.
*Peebles	Dr. Geo. F. Thomas.
Pemberville	Dr. R. J. Simon.
Peninsula	Dr. W. N. Boerstler.
Perrysburg	J. H. Hayes.
Perrysville	D. W. Webster.
Philo P. O. (Taylorsville)	Reese Mercer.
*Pickerington	Douglas Phillips.

*In lieu of board of health.

Place.	Health Officer.
Piketon	Andrew Martin.
*Pioneer	Arthur F. Norris.
Piqua	Dr. F. E. Kitzmiller.
Pittsburg P. O. (Arnettsville)	Dr. J. O. Starr.
*Plain City	Oran Long.
*Plainfield	Wesley E. Lawrence.
*Pleasant City	J. W. Trott.
Pleasant Hill	Daniel Brown.
*Pleasant Ridge	C. W. Acomb.
*Pleasantville	M. B. McCleery.
*Plymouth	Dr. Geo. J. Searle.
Poland	Dr. C. R. Justice.
Polk	Dr. W. H. Rinehart.
*Pomeroy	Dr. C. A. Ihle.
*Portage	Elmer D. Quaintance.
Port Clinton	Dr. David Gillard.
*Port Jefferson	Dr. D. J. Cargill.
Portsmouth	Dr. W. W. Smith.
Port Washington	Dr. F. B. Larimore.
Port Williams (Hamlet)	S. L. Thorpe.
*Potsdam P. O. (New Lebanon)....	Dr. D. W. Shellabarger.
Powhatan Point	Franz Saner.
*Prairie Depot P. O. (Freeport)....	J. W. Graham.
Proctorville	Dr. R. E. Atkinson.
Prospect	G. F. Gast.
Put-in-Bay	Adam Heidle.
Quaker City	W. W. Dowdell.
*Quincy	Dr. S. W. Simmons.
*Kacine	Dr. John Philson.
*Rarden	Grafton Windle.
Ravenna	Henry F. Shreader.
Rawson	Michael Smith.
Reading	George Siebel.
*Rendville	Dr. H. S. Cozad.
Republic	C. E. Womer.
*Reynoldsburg	B. F. Orem.
Richmond (See Grand River P. O.)	
Richmond	Dr. Samuel Rothacker.
Richwood	Geo. W. Morgan.
Ridgeway	Dr. S. S. Webster.
*Ripley	Dr. A. W. Francis.
Rising Sun	M. C. Mowen.
*Rochester	Dr. Jno. T. Henderson.
*Rock Creek	B. C. Carpenter.
Rockford	Geo. Kimble.
Rockport (See West Park P. O.)...	
*Rocky Ridge	John Krehmke.
*Rocky River	Dr. Charles L. Wood (Lakewood).
*Rogers	
Rome (See Stouts P. O.) Hamlet..	
*Roscoe	J. S. Reed.
*Roseville	T. C. Hilliard.

* In lieu of board of health.

Place.	Health Officer
*Rossburg P. O.....	D. H. Brown.
Rossville (See Rossburg P. O.)....	
Rushsylvania	W. H. Drum.
*Rushville	Dr. W. C. Lewis.
Russellville	Dr. A. Gillfillen.
*St. Bernard	Dr. J. W. Theil.
*St. Clairsville	Dr. S. L. West.
*St. John	E. L. Blank.
St. Louisville	Dr. L. L. Marriott.
St. Marys	Dr. I. E. Williams.
*St. Paris	Dr. C. A. Offenbacher.
*Sabina	Dr. Samuel B. Lightner.
Salem	Dr. E. J. Schwartz.
*Salesville	Wm. T. Carpenter.
Saineville	Dr. H. M. Calvin.
Sandusky	Dr. Wm. H. Busch.
*Sarahsville	Eli H. Bates.
*Savannah	Timothy Stinebring
Scio	Dr. G. D. Custer.
*Scott	William Keltner.
Sebring	Frank Chisler.
Sedalia P. O. (Midway).....	Dr. E. B. Mead.
*Sekitan P. O. (Addyston).....	Dr. J. H. Haire.
*Senecaville	Richard Lowry.
*Seven Mile	C. B. Wilson.
Seville	Dr. P. E. Beach.
*Shanesville	John Jordan.
Sharon	J. A. Reid
*Shawnee	David T. Harris.
Shelby	Dr. Roy E. Smucker.
Sherodsville	S. J. T. Pearch.
Sherwood	Dr. H. C. Lindersmith.
Shiloh	Dr. S. S. Holtz.
*Shreve	John C. Mauson.
Sidney	Wm. C. Wyman.
*Silverton	Dr. A. A. Sprague.
*Sinking Spring	John W. Hite.
Smithfield	Ross C. Moore.
*Smithville	W. G. Zimmerman.
Somerset	Dr. Michael Clonse.
*Somerville	Frank Chapin.
South Bloomfield	
South Brooklyn (Brooklyn P. O.)..	
*South Charleston	Jason Mercer
South Lebanon P. O. (Deerfield)...	Dr. A. D. Spence.
*South Point	Dr. C. Wayne McCoy.
South Salem	Dr. E. C. Lumbeck
South Solon	Dr. W. H. Queen.
*South Webster	S. S. Ferguson.
*South Zanesville	Noah O. Wirick.
Sparta	S. G. Fowls.
Spencerville	G. A. Rusler.

*In lieu of board of health.

Place.	Health Officer.
Springborough	John W. Bloss.
Springfield	Dr. John M. Buckingham.
*Spring Hills	Oliver H. Eby.
*Spring Valley	Dr. S. E. Dyke.
Steubenville	John Welch.
Stewart	G. H. Hawk.
*Stockport	Dr. T. J. Lyne.
Stouts P. O. (Rome)	Dr. R. Y. Littleton.
Strasburg	Dr. J. C. Schutzbach.
*Struthers	Arthur L. Jones.
*Stryker	John E. Meek.
Sugar Creek	J. E. Kauffman.
*Sugar Grove	Dr. E. R. Brown.
Summerfield	John Baughin.
Sunbury	Dr. G. H. Gerhardt.
Swanton	B. F. Mills.
*Sycamore	Dr. Isaiah B. Gibbs.
*Sylvania	A. E. Stow.
*Tarlton	W. A. Leist.
Taylorville (Philo P. O.)	
*Thornville	O. J. Stevens.
Thurman P. O. (Centerville)	Lewis W. Davis.
Tiffin	Dr. A. C. Schwartz.
*Tiltonville P. O. (Grover)	Wm. Cunningham.
Tippecanoe City	F. N. Agenbroad.
Tiro	Dr. W. H. Guiss.
Toledo	Dr. J. C. Reinhart.
*Tontogany	Dr. Thos. A. Bickerstaph.
*Toronto	John Wellington, Sr.
Trenton	Wilson Thompson.
*Trimble	Arthur W. Dean.
Trinway	LeRoy Rose.
*Trotwood	Jesse C. Minnich.
Troy	Dr. J. W. Means.
*Tuscarawas	John W. Wood.
Uhrichsville	Finley Johnston.
Union City	Clinton Earnhart.
Uniontown P. O. (Fultonham)	
*Unionville Center	Dr. C. O. McCune.
*Uniopolis	J. W. Logan.
*Upper Sandusky	Dr. G. O. Maskey.
Urbana	Dr. H. M. Pearce.
Utica	A. W. Vance.
Van Buren	Jas. P. Grubb, Mayor.
*Vandalia	Dr. W. H. Riley.
Vanlue	Dr. Jas. L. Schrotz.
Van Wert	Dr. C. G. Church.
Venedocia	Dr. David Davis.
Vermilion	J. M. Delker.
Versailles	Dr. C. F. Ryan.
Vienna (See Vienna X Roads P. O.)	
Vienna X Roads P. O. (Vienna)	Dr. E. A. Dye.

*In lieu of board of health.

Place.	Health Officer.
*Vinton	William McMillin.
Wadsworth	M. C. Lytle, Acting.
Waldo	Dr. B. D. Osborn.
Wapakoneta	A. Kohler.
Warren	Dr. Geo. N. Simpson.
Warsaw	S. W. Willis.
Washington	S. B. Lawrence.
Washington C. H.	F. M. Bateman.
*Washingtonville	C. E. Holt.
Waterloo (See Pancoastburg P. O.).	
Waterville	H. T. Van Fleet.
Wauscon	Frank Yarnell.
Waverly	James J. Emmitt.
Waynesburg	Dr. Gustav A. Shane.
Waynesfield	George Schneider.
Waynesville	Dr. Thomas Sherwood.
Webster	J. F. Byrd.
*Wellington	Dr. R. G. Holland.
Wellston	Peter Gallagher.
Wellsville	Dr. M. C. Tarr.
*West Alexandria	John P. Stock.
*West Carrollton	Frank E. Hinkson.
West Cairo	Dr. Chas. E. Stadler.
West Elkton	Dr. Elwood Holaday.
Western Star	Fred. Becker.
Westerville	P. A. Conklin.
*West Farmington	F. W. Ogram.
West Jefferson	Albert Clark.
West Lafayette	J. T. Carter.
West Leipsic	Eugene Lamphear.
*West Liberty	Dr. A. C. Brindle.
*West Manchester	Carsey Rentfrow.
*West Mansfield	Dr. H. A. Skidmore.
West Mill Grove	Dr. C. B. Hatfield.
West Milton	Dr. Gainor Jennings.
Weston	Dr. J. W. Williams.
*West Park P. O. (Rockport)	Dr. Chas. L. Wood (Lakewood).
West Rushville	
*West Salem	Dr. J. W. Ferguson.
West Union	Dr. James W. Bunn.
*West Unity	Joseph Fisher.
Wharton	J. J. Mayer.
*Whitehouse	J. F. Lehman.
Wilkesville	Dr. G. W. Martin.
*Williamsburg	Dr. G. L. Hines.
Williamsport	Dr. D. H. Marcy.
Willoughby	James Maloney.
Willow P. O. (Newburg Heights) ..	Dr. W. M. James.
*Willshire	Dr. C. W. Bobo.
Wilmington	Dr. A. T. Quinn.
Wilmot	Dr. O. Curtis Ricksecker.
*Winchester	Dr. C. S. Corboy.

*In lieu of board of health.

Place.	Health Officer.
Winchester (Sec Gratis P. O.)	
Windham	H. J. Higley.
Woodsfield	John Beard.
Woodstock	D. P. Smith.
Woodville	Dr. R. M. Durbin.
Wooster	Dr. J. W. Lehr.
*Worthington	Charles E. Wilson.
Wyoming	George Stoddard.
*Wren	P. C. Havice.
Xenia	Dr. L. H. Brundage.
Yellow Springs	J. P. Funderburg.
*Yorkshire	Alva Finkbone.
Youngstown	Dr. H. E. Welch.
Zaleski	Sylvester Shry.
*Zanesfield	Dr. O. H. McDonald.
Zanesville	Dr. G. Warburton.
*Zoar	Frank Ackerman.

*In lieu of board of health.

ANNUAL REPORTS OF
LOCAL BOARDS OF HEALTH

OHIO STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY.

COLUMBUS, OHIO, December 15, 1905.

**To the Boards of Health and Health Officers:*

DEAR SIRs:—The law requires local boards of health to make an annual report on or before the 15th day of January of each year to the State Board of Health. (See Section 1536-765, R. S.) These reports, under the amended law, are for the calendar year. We would like to have your report to include the important features of the work of the board, or health officer where there is no board, during the year.

1. What improvements, if any, have been made in the sanitary condition of your city or village?
2. Have any new regulations been enforced as regards the milk supply, the collection of garbage, etc.?
3. Have you encountered difficulties in enforcing the health laws or orders of the board; and if so, in what particular?
4. Was there an unusual prevalence of any particular disease during the year, and if so, what disease and at what season?
5. If there were cases of, or deaths from, cerebro-spinal meningitis, please give the number.
6. What per cent. of your population depend upon wells for a domestic water supply?

Any other items of interest as regards the sanitary condition of your town or the work of your board of health will be gladly received.

Please make out your report on pages 2 and 3 (blank pages) of this folder, and send it in, if possible, by January 15, 1906, as we desire to include it in the annual report of the State Board of Health to the Governor. *Do not write on this page.*

*Copy of letter sent to all health officers.

INFECTIOUS DISEASES.

NUMBER OF CASES REPORTED DURING THE YEAR.

(Give *Cases* only.)

Smallpox	Typhoid Fever
Diphtheria	Whooping Cough
Membranous Croup	Measles
Scarlet Fever	Other infectious diseases.....

Total number of infectious diseases.....

Additional blanks will be sent if needed.

Very respectfully,

C. O. PROBST, M. D.,

*By order of the Board.**Secretary.*

ANNUAL REPORTS OF LOCAL BOARDS OF HEALTH.

ABERDEEN, BROWN COUNTY.

Population, 700.

Person making report, Dr. T. A. Laughlin, health officer.

1. None made.
2. We have no regulations in regard to the milk supply and the garbage is disposed of as in all towns of the size of Aberdeen.

3. No.

4. We have been singularly free from all diseases the past year. Aberdeen has always been considered a healthy town, being visited by but four serious epidemics during its history.

5. Not one case has presented itself.

6. Fully 50 per cent.

We, as a board, have nothing of interest to report.

The members after having qualified had little to do except occasionally directing the marshal, who acted as sanitary policeman, to investigate the condition of some vault.

While the town depends in part upon well water, the wells are so situated that the drainage around them is good, and since being a resident of the town (a matter of four years) I have known of no case of typhoid that was traceable to any of the wells.

Cases of infectious diseases reported: Diphtheria, 1.

ADA, HARDIN COUNTY.

Population, 3,300.

Person making report, W. H. Morrow, health officer.

Cases of infectious diseases reported: Membranous croup, 2; typhoid fever, 4; measles, 6.

ADAMSVILLE, MUSKINGUM COUNTY.

Population, 200.

Person making report, G. W. McDowell, health officer.

We have had no deaths during time specified, nor any cases of contagious diseases to report.

AKRON, SUMMIT COUNTY.

Population, 50,000.

Person making report, A. A. Kohler, M. D., health officer.

1. Nothing out of the ordinary line of work has been done during the year.

2. No.

3. No.

4. We have had no prevalence of any contagious diseases during the year.

5. No.

6. Two-thirds of the population use well water for drinking and cooking purposes.

The death rate in Akron last year was 11.20 per thousand. During 1905 there were 560 deaths. Reports of 206 cases of contagious diseases were received during the year. Typhoid fever had the greatest number, 83, which was 29 more cases than in 1904. Fourteen cases of typhoid were fatal, which was two less than during 1904. Heart disease caused the greatest number of deaths and pneumonia next. Heart disease caused 55 and pneumonia 50. The diminution in the death rate was probably credited to the physicians reporting contagious diseases.

There were 1,181 births in 1905, 592 were males and 589 females. All but ten were white.

Cases of infectious diseases reported: Smallpox, 3; diphtheria, 29; membranous croup, 1; scarlet fever, 51; typhoid fever, 83; whooping cough, 17; measles, 12; other infectious diseases, 10. Total number of infectious diseases, 206.

ALGER, HARDIN COUNTY.

Population, 850.

Person making report, U. P. L. Vermillion, marshal.

1. The drainage of our town is very good with the exception of excessive floods which sometimes flood the west part of town.

2. No new regulations in regard to milk. Each individual sees to caring for his or her own garbage.

3. We have not had any trouble in enforcing the health laws.

4. We had the good fortune to be very healthy last year.

6. We all depend upon wells for our water supply.

source of disease and I believe impure milk is sold at this time in our city. I believe in a rigid enforcement of the food laws, but it is not done here. I believe you will save thousands of lives especially of children, if you put the man out of business who sells impure milk, meat, butter or any other food.

Cases of infectious diseases reported: Diphtheria, 23; scarlet fever, 8; typhoid fever, 27. Total number of infectious diseases, 58.

AMANDA, FAIRFIELD COUNTY.

Population, 570.

Person making report, W. A. Cromley, secretary local board of health.

1. The annual spring cleaning up.

2. No.

3. No.

4. No.

5. None.

6. One hundred per cent.

Cases of infectious diseases reported: Typhoid fever, 2.

ALLIANCE, STARK COUNTY.

Population, 12,000.

Person making report, Dr. J. A. Roach, health officer.

Alliance board of health quit business about November 1, 1905, and that department is now with the board of public service. My term expired January 1, 1906.

1. None.

2. No.

3. No.

4. No.

5. None.

6. Have no way of knowing, but probably 10 per cent.

The majority of the cases of typhoid were due to infected milk. I believe an inspection of some of the milk sold in this city would reveal other impurities. During my term of eight months as health officer I heard more complaints about milk than any other

AMELIA, CLERMONT COUNTY.

Population, 600.

Person making report, Chas. W. Coleman, health officer.

1. None.

2. None.

3. No.

4. None.

5. None.

6. Five per cent.

ANNA, SHELBY COUNTY.

Population, 600.

Person making report, D. R. Millette, M. D., health officer.

1. No improvement.

2. No.

3. No.

4. Whooping cough; during summer months.

5. None.

6. All.

Cases of infectious diseases reported:
Typhoid fever, 1; whooping cough, 14.
Total number of infectious diseases, 15.

ANSONIA, DARKE COUNTY.

Population, 750.

Person making report, C. I. Stephen,
health officer.

Cases of infectious diseases reported:
Typhoid fever, 2.

ANTWERP, PAULDING COUNTY.

Population, 1,250.

Person making report, E. K. Ter-
willeger, health officer.

Cases of infectious diseases reported:
Typhoid fever, 10.

APPLE CREEK, WAYNE COUNTY.

Population, 400.

Person making report, W. H. Wink-
ler.

We have no health board and I am
acting as health officer, ex officio.

1. No special improvements.

2. No.

3. No.

4. None.

5. No.

6. Twenty-five per cent. use foun-
tain or continuous flowing water.

Cases of infectious diseases reported:
Typhoid fever, 2; whooping cough, 10;
other infectious diseases, 8. Total
number of infectious diseases, 20.

ARCADIA, HANCOCK COUNTY.

Population, 500.

Person making report, W. W. Moore,
health officer.

1. None.

2. No milk sold.

3. None.

4. Not any.

5. None.

6. One hundred per cent.

ARCANUM, DARKE COUNTY.

Population, 1,500.

Person making report, Dr. P. W.
Byers, clerk board of health.

1. We have made semi-annual in-
spections of the village, ordered all
vaults not in a sanitary condition
cleaned and repaired.

2. Garbage has been collected and
conveyed away by wagons employed by
council when necessary.

4. The general health has been very
good in our little village for the last
year; have not been visited by any epi-
demic of contagious disease.

6. The entire population formerly
depended upon wells for their water
supply. We now have hydrant water
installed in the village. The supply is
from deep bored wells. At present
some are making use of it for house
use.

Cases of infectious diseases reported:
Typhoid fever, 8.

ARCHIBOLD, FULTON COUNTY.

Population, 1,000.

Person making report, August Ruih-
ley, health officer.

Cases of infectious diseases reported:
Typhoid fever, 1.

ARLINGTON, HANCOCK COUNTY.

Population, 900.

Person making report, Solomon
Bates, health officer.

Cases of infectious diseases reported:
Smallpox, 1; scarlet fever, 60; whoop-

ing cough, 2. Total number of infectious diseases, 63.

ARLINGTON HEIGHTS, HAMILTON COUNTY.

Population, 350.

Person making report, H. R. Vedern, health officer.

1. No change in the sanitary condition of the village.

2. No new regulations governing sale of milk and collection of garbage.

6. No change in water supply.

Cases of infectious diseases reported: Typhoid fever, 4.

ARNOTTSVILLE, DARKE COUNTY.

Population, 250.

Person making report, J. O. Starr, M. D., health officer.

1. Improved drainage.

2. No.

3. No.

4. No.

5. None.

6. One hundred per cent.

ASHLEY, DELAWARE COUNTY.

Population, 700.

Person making report, Rodman Welch, health officer.

1. Thorough tiling.

2. Hauling garbage to country.

3. No.

4. No.

5. No.

6. All.

Cases of infectious diseases reported: Typhoid fever, 1. Total number of infectious diseases, 5.

ASHLAND, ASHLAND COUNTY.

Population, 6,500.

Person making report, F. V. Dotterweich, health officer.

Cases of infectious diseases reported: Smallpox, 6; typhoid fever, 7. Total number of infectious diseases, 13.

ASHTABULA, ASHTABULA COUNTY.

Population, 1,500.

Person making report, A. W. Hopkins, health officer.

1. No special improvements.

2. New rules adopted to regulate the milk supply.

3. No.

4. No.

5. Only one.

6. Forty per cent.

Cases of infectious diseases reported: Diphtheria, 6; scarlet fever, 1. Total number of infectious diseases, 7.

ASHVILLE, PICKAWAY COUNTY.

Population, 1,000.

Person making report, John Johnson, health officer.

1. None.

2. Yes.

3. No.

4. No.

5. None.

6. All.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 1. Total number of infectious diseases, 2.

ATHENS, ATHENS COUNTY.

Population, 6,000.

Person making report, J. M. Higgins, health officer.

We believe this to be the healthiest town in the state.

Cases of infectious diseases reported:
Scarlet fever, 4; typhoid fever, 5. Total number of infectious diseases, 9.

ATTICA, SENECA COUNTY.

Population, 1,000.

Person making report, C. A. Force, health officer.

1. Have more rigidly enforced cleaning up.
2. No.
3. No.
4. No.
5. None.
6. About 50 per cent.

Cases of infectious diseases reported:
Whooping cough, 12.

AVON, LORAIN COUNTY.

Population 2,500.

Person making report, Dr. Jno. R. Pipes, health officer.

1. None necessary excepting the cleaning the two or three privy vaults by order of the health officer.

2. No.
3. No. My serving written notice receives immediate attention.
4. No.
5. None.
6. About 99 per cent. A few use cistern water.

Cases of infectious diseases reported:
Diphtheria, 2; typhoid fever, 2; whooping cough, 4. Total number of infectious diseases, 8.

BAIRDSTOWN, WOOD COUNTY.

Population, 298.

Person making report, A. W. Solomon, health officer.

Cases of infectious diseases reported:
Typhoid fever, 2; whooping cough, 2. Total number of infectious diseases, 4.

BAINBRIDGE, ROSS COUNTY.

Population, 1,000.

Person making report, Dr. R. H. McKee, health officer.

1. Sanitary condition always pretty good. There has been no particular improvement during the last year.

2. No.
3. No.
4. No.
5. None.
6. About 50 per cent.

Cases of infectious diseases reported:
Diphtheria, 6; scarlet fever, 12; whooping cough, 20. Total number of infectious diseases, 38.

BALTIMORE, FAIRFIELD COUNTY.

Population, 550.

Person making report, L. K. Davis, health officer.

Cases of infectious diseases reported:
Typhoid fever, 1.

BARBERTON, SUMMIT COUNTY.

Population, 8,000.

Person making report, Bert Rodenbaugh, M. D., health officer.

1. The council has passed an ordinance prohibiting the accumulation of garbage. Also a city waterworks has been established, thereby lowering very greatly the typhoid cases this year over last year.

2. An ordinance has been passed requiring a milk permit to be taken out by all milkmen.

3. The garbage ordinance seems to give the most trouble.

4. Measles, spring of 1905.

5. There was only one case of supposed cerebro-spinal meningitis, but the doctor reporting the same was not exactly sure, so I classed it in with simple meningitis.

6. A very small per cent., perhaps 2 per cent., as our city water mains have been extended to all parts of the village.

Cases of infectious diseases reported: Diphtheria, 3; membranous croup, 1; scarlet fever, 4; typhoid fever, 10; measles, 13; other infectious diseases, 1. Total number of infectious diseases, 32.

BARNESVILLE, BELMONT COUNTY.

Population, 4,500.

Person making report, D. O. Shepard, M. D., health officer.

1. Barnesville has made sanitary improvements in the way of a complete water system which is ready for operation as soon as passed by the State Board of Health.

A resolution was adopted which prohibits the keeping of hogs within the corporation and the council passed a spitting ordinance which adds to our sanitary condition.

2. No.

3. No.

4. Yes, measles.

5. None.

6. One hundred per cent.

We are trying to get a system adopted for keeping a mortality report.

Cases of infectious diseases reported: Diphtheria, 2; scarlet fever, 9. Total number of infectious diseases, 11.

BATAVIA, CLERMONT COUNTY.

Population, 1,200.

Person making report, C. H. Crane, health officer.

1. Merely surface drainage.

2. No.

3. No.

4. Scarlet fever in light form—October, November and December.

5. None.

6. Not over 5 per cent. of population.

Cases of infectious diseases reported: Scarlet fever, 6.

BEAVER, PIKE COUNTY.

Population, 300.

Person making report, E. B. Schrock, health officer.

Improvements are very scarce in this line, as the people here are not inclined towards making them. Have ordered a few vaults cleaned and put in a sanitary condition.

BEAVER DAM, ALLEN COUNTY.

Population, 500.

Person making report, Dr. J. B. Haines, health officer.

Cases of infectious diseases reported: Measles, 1.

BEDFORD, CUYAHOGA COUNTY.

Population, 2,004.

Person making report, Thomas E. Mathews, health officer.

1. Have cleaned all waterways and removed all privies from same.

2. None.

3. Nothing serious.

4. None.

6. Wells are the only supply we have.

Cases of infectious diseases reported: Typhoid fever, 4; whooping cough, 1. Total number of infectious diseases, 5.

BELLAIRE, BELMONT COUNTY.

Population, 12,000.

Person making report, Dr. D. W. Boone, health officer.

1. None.

2. No.

3. No.

4. No.

5. Two.

* 6. We have 6 drove wells, but they are not used only in warm weather and when the river water is very muddy.

Cases of infectious diseases reported: Diphtheria, 19; membranous croup, 1; scarlet fever, 1; measles, 4. Total number of infectious diseases, 25.

BELLE VALLEY, NOBLE COUNTY.

Population, 650.

Person making report, C. W. Miller, health officer.

1. None.
2. No.
3. No.
4. No.
5. None.

6. One hundred per cent., some of the wells are drilled and some are dug, those that are dug are in low, swampy ground. The water supply is very poor here.

Cases of infectious diseases reported: Typhoid fever, 1.

BELLVILLE, RICHLAND COUNTY.

Population, 1,100.

Person making report, C. E. Hunter, health officer.

1. None.
2. No.
3. Yes, in getting people to dispose of their garbage, clean up alleys, etc.
4. Measles were unusually prevalent last spring.
5. No.
6. One hundred per cent.

BELMONT, BELMONT COUNTY.

Population, 500.

Person making report, H. O. Gatten, health officer.

4. Scarlet fever, during summer season.

6. One hundred per cent.

Cases of infectious diseases reported: Scarlet fever, 16; diphtheria, 3; typhoid fever, 7. Total number of infectious diseases, 26.

BELOIT, MAHONING COUNTY.

Population, 500.

Person making report, R. R. Boyle, health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. One hundred per cent.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 2; typhoid fever, 3. Total number of infectious diseases, 6.

BELPRE, WASHINGTON COUNTY.

Population, 1,500.

Person making report, Jesse McGrew, health officer.

3. Chief difficulty was in compelling owners of pigs to keep pens clean.
6. Probably 10 per cent. depend upon wells for water supply.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 2. Total number of infectious diseases, 3.

BEREA, CUYAHOGA COUNTY.

Population, 3,000.

Person making report, T. L. McKean, clerk of board of health.

There has been no meeting held for more than a year. Nothing has been done. No reports are made concerning births, deaths or diseases. The only work that the clerk has been called

upon to do is to sign an occasional transportation permit and renew the embalmer's license.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 1. Total number of infectious diseases, 4.

BERLIN X ROADS, JACKSON COUNTY.

Population, 500.

Person making report, Henry Davis, health officer.

1. No improvements.
2. None.
3. Yes, in getting privies and pig pens cleaned properly.
4. None.
5. None.
6. About one hundred per cent.

Cases of infectious diseases reported: Diphtheria, 5; scarlet fever, 1; typhoid fever, 1; other infectious diseases, 1. Total number of infectious diseases, 8.

BERLIN HEIGHTS, ERIE COUNTY.

Population, 1,000.

Person making report, G. W. Hine, M. D., health officer.

1. None.
2. No.
3. Yes, physicians making reports of cases.
4. No.
5. None.
6. All.

BETHEL, CLERMONT COUNTY.

Population, 1,100.

Person making report, W. E. Thompson, health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. Probably 95 per cent. depend upon wells for water supply.

BETTSVILLE, SENECA COUNTY.

Population, 503.

Person making report, C. G. Norton, health officer.

Sanitary condition of village is very good; water supply used is entirely from wells.

Cases of infectious diseases reported: Typhoid fever, 1.

BLAKESLEE, WILLIAMS COUNTY.

Population, 230.

Person making report, James B. Lauchlen, health officer.

We consider the sanitary condition of our village to be good.

So far we have had no cases of contagious diseases.

BLANCHESTER, CLINTON COUNTY.

Population, 2,000.

Person making report, U. B. Chambers, health officer.

Cases of infectious diseases reported: Scarlet fever, 3; measles, 1. Total number of infectious diseases, 4.

BLOOMINGBURG, FAYETTE COUNTY.

Population, 600.

Person making report, H. W. Worrell, health officer.

1. The sanitary condition is good.
2. No.
3. No.
4. No.
5. No.
6. One hundred per cent.

BLUFFTON, ALLEN COUNTY.

Population, 2,000.

Person making report, J. J. Sutter, health officer.

1. The village failed to receive the required number of votes to bond it for a sewerage system, we therefore repaired all old surface water drains, and have a private sewer for the use of a number of flats, school building and several residences. This puts us in as good a sanitary condition as possible.

2. No new regulations have been enforced regarding milk supply, etc.

3. We have no difficulty in enforcing the health laws.

4. Whooping cough is the only contagious disease reported to me during the year.

6. We have excellent drinking water, both from wells and city water-works. About 30 per cent. have drilled wells and 50 per cent. dug wells, the balance use city water.

Cases of infectious diseases reported: Whooping cough, 2. (Sept. 28 to Jan 1.)

5. None.

6. All.

Cases of infectious diseases reported: Whooping cough, 2. Total number of infectious diseases, 20.

BOWLING GREEN, WOOD COUNTY.

Population, 6,000.

Person making report, J. B. Miller, health officer.

Cases of infectious diseases reported: Diphtheria, 2; scarlet fever, 9; typhoid fever, 45. Total number of infectious diseases, 56.

BRADFORD, MIAMI AND DARKE COUNTIES.

Population, 1,450.

Person making report, H. J. McKinney, health officer.

1. Our village is situated in the two counties of Darke and Miami and had quite an amount of sewerage constructed during the past season; a general cleaning up of public and private properties, streets and alleys was ordered also. Some cess-pools, night soil and garbage were removed, and we are now in a fair sanitary condition.

3. We had some trouble getting physicians to report, but I think it was on account of not being furnished blanks, but hereafter this difficulty will be remedied.

4. Had no infectious disease except whooping cough and typhoid fever in July, August and September.

5. One case of cerebro-spinal meningitis reported.

6. All of the population depend on wells, mostly private, and cisterns, mostly for fire protection and sprinkling. We have no pest house or tents. There is no dumping ground, but we expect to have one in the near future.

Cases of infectious diseases reported: Typhoid fever, 3; whooping cough, 3. Total number of infectious diseases, 6.

BOLIVAR, TUSCARAWAS COUNTY.

Population, 700.

Person making report, C. H. Lebold, health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. All.

BOWERSVILLE, GREENE COUNTY.

Population, 400.

Person making report, J. E. Steward, health officer.

1. None.

2. None.

3. No.

4. No.

BRADNER, WOOD COUNTY.

Person making report, O. J. Mitchell,
health officer.

1. None.
2. No.
3. No.
4. No.
5. No.
6. One hundred per cent.

Cases of infectious diseases reported:
Scarlet fever, 2.

Smallpox, 1; diphtheria, 5; membran-
ous croup, 1; scarlet fever, 2. Total
number of infectious diseases, 9.

BROUGHTON, PAULDING COUNTY.

Population, 280.

Person making report, James Boroff,
health officer.

Cases of infectious diseases reported:
Smallpox, 5.

BRATENAHL, CUYAHOGA COUNTY.

Population, 500.

Person making report, J. G. New-
kirk, marshal.

1. The sanitary conditions of this
village are good, each sewer connection
made to sanitary sewer consists of one
connection 6 inches in diameter. As a
rule there is one closet, one bath and
one lavatory connected to this size
connection.

2. No new regulations have been
enforced as regards the milk supply,
the collection of garbage, etc.

5. No cases of, or deaths, from
cerebro-spinal meningitis.

6. No per cent. of our population
depends upon wells for a domestic
water supply.

Cases of infectious diseases reported:
Diphtheria, 1; scarlet fever, 2. Total
number of infectious diseases, 3.

BRYAN, WILLIAMS COUNTY.

Population, 3,900.

Person making report, N. Vineyard,
health officer.

1. None necessary.
2. Milk supply good. Garbage
hauled to dump grounds.
3. None.
4. None.
5. One, slight.
6. Nearly all use flowing wells and
bored wells.

Cases of infectious diseases reported:
Diphtheria, 1; scarlet fever, 1. Total
number of infectious diseases, 2.

BUCHTEL, ATHENS COUNTY.

Population, 1,000.

Person making report, A. P. Lee,
M. D., health officer.

Cases of infectious diseases reported:
Diphtheria, 3; scarlet fever, 3; typhoid
fever, 2. Total number of infectious
diseases, 8.

BRIDGEPORT, BELMONT COUNTY.

Population, 4,000.

Person making report, W. M. Oates,
M. D., health officer.

1. None.
2. No.
3. No.
4. No.
5. One.
6. Two or three per cent.

Cases of infectious diseases reported:

BUCYRUS, CRAWFORD COUNTY.

Population, 8,000.

Person making report, A. H. Mc-
Crory, health officer.

1. Not any.
2. No.

3. No.

4. No.

5. None.

6. About 80 per cent. of the population depend upon wells, 20 per cent. upon filtered cisterns.

Cases of infectious diseases reported: Diphtheria, 15; scarlet fever, 3; typhoid fever, 8; whooping cough, 4; other infectious diseases, chickenpox and mumps, 49. Total number of infectious diseases, 79.

BUFFALO, GUERNSEY COUNTY.

Population, 1,000.

Person making report, L. F. Dudley, health officer.

1. None, except cleaning alleys and clearing away of rubbish. The sanitary condition of town good at present time.

2. None.

3. None.

4. No.

5. None.

6. One hundred per cent.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 6; typhoid fever, 9. Total number of infectious diseases, 18.

BURBANK, WAYNE COUNTY.

Population, 400.

Person making report, A. W. Hoffman, health officer.

1. No improvements made in the sanitary condition of the village; they are good.

2. No new regulations in regard to milk or garbage.

3. No.

4. No.

6. About all depend on wells for water.

Cases of infectious diseases reported: Scarlet fever, 1.

BURKETTSVILLE, DARKE AND MERCER COUNTIES.

Person making report, Dr. B. G. Inman, health officer.

The sanitary condition of our village is good. We have no trouble in enforcing the law, we have educated the people to believe that the law must be observed. This is especially true in regard to contagious diseases. If all local boards of health would enforce the existing laws they would be richly repaid by wiping out a large portion of our contagious diseases. In my judgment it is not more law, but a rigid enforcement of our present laws that is needed.

Cases of infectious diseases reported: Membranous croup, 1; typhoid fever, 1. Total number of infectious diseases, 2.

BUTLER, RICHLAND COUNTY.

Population, 800.

Person making report, E. G. Rummel, health officer.

1. None.

2. No.

3. Trouble about keeping hogs in village after April 1. Prosecuted one person.

4. No.

5. No.

6. Eighty per cent.

Cases of infectious diseases reported: Typhoid fever, 1.

BYESVILLE, GUERNSEY COUNTY.

Population, 3,000.

Person making report, C. C. Large, health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 2; Total number of infectious diseases, 3.

CADIZ, HARRISON COUNTY.

Population, 2,000.

Person making report, S. B. McGavran, health officer.

Cases of infectious diseases reported:
Scarlet fever, 10; typhoid fever, 6.
Total number of infectious diseases, 16.

Cases of infectious diseases reported:
Diphtheria, 5; scarlet fever, 11; typhoid fever, 21; measles, 18. Total number of infectious diseases, 55.

CAMDEN, PREBLE COUNTY.

CALDWELL, NOBLE COUNTY.

Population, 1,500.

Person making report, J. L. Gray, M. D., health officer.

Cases of infectious diseases reported:
Scarlet fever, 3; typhoid fever, 4. Total number of infectious diseases, 7.

Population, 1,000.

Person making report, Wm. E. Pryor, health officer.

1. There has been no particular improvement in the sanitary condition of our village, it is really very good as it is, much better than the average.

2. Nothing done in regard to the milk supply, it is not necessary. Each family disposes of its own garbage.

3. We have no trouble in enforcing health laws or orders of the health office. The people know that an order will be enforced and obey the order when issued.

4. No.

5. No.

6. One hundred per cent.

Our wells are excellent. Only 4 to 6 feet to gravel, which is of great depth. There has not been a case of typhoid fever in our town for three or more years.

Cases of infectious diseases reported:
Scarlet fever, 4; whooping cough, 2. Total number of infectious diseases, 6.

CALEDONIA, MARION COUNTY.

Population, 682.

Person making report, M. H. Underwood, clerk of board of health.

1. None, except to keep in good sanitary condition.

2. There are no milk peddlers. We care for our own garbage.

3. No.

4. None.

5. None.

6. One hundred per cent.

Have had no contagious disease during the year—Very fortunate.

CAMBRIDGE, GUERNSEY COUNTY.

Population, 11,500.

Person making report, T. C. Stanley, health officer.

1. Extension of sanitary and storm sewers.

2. No.

3. No.

4. None.

5. None.

6. Seventy-five per cent.

CANAL FULTON, STARK COUNTY.

Population, 1,170.

Person making report, D. K. Jones, M. D., clerk of board of health.

1. None.

2. No.

3. No.

4. No.

5. None.

6. Seventy-five per cent.

CANNELVILLE, MUSKINGUM COUNTY.

Population, 700.

Person making report, R. T. Homan, health officer.

All population use wells.

Cases of infectious diseases reported:
Scarlet fever, 1.

CANTON, STARK COUNTY.

Population, 40,000.

Person making report, A. V. Smith, M. D., health officer.

1. The improvements in the sanitary condition of the city in the past year are of much importance. The betterment is in the new sewer, which gives relief to the western district. Beginning in the south part, extending to the north end as far as the improvements seem to be practicable. There have been a great many new houses constructed in this part of the city. The result is that we have been able to prevent the construction of many cesspools, which have been the curse of the people at large. They are retorts for the breeding of disease. The issuing of permits for cesspools has been much restricted, as many seem to avoid connecting with the sewers, even in the old districts, where they should have connected years ago, the cesspool has thus been kept up. Wherever there has been any complaint, we have caused the same to be abated, and where there was an application for one it has been refused if it were possible to connect with the sewer.

2. There has been no material change in the handling of milk. The collection of garbage is the same as it has been for the past year.

3. According to the different health authorities in this locality and the statistics of this department, Canton is one of the healthiest cities to live in to be found in this country.

During the year there were just 427 deaths, an increase over the previous year when there was exactly one for each day in the year—365. Diphtheria was one of the most prevalent of contagious diseases, but there was no epidemic at any time. During the past year there was very little typhoid fever, most of the cases being imported from other localities.

At the present time there are several cases of measles in the city, but there is nothing alarming about that. During the year past we have had but one case of smallpox. It was a busy year for the sanitary officer, however, for there was a general cleaning up in every locality. I have had very little trouble among the residents of the city in regard to the violation of the health regulations, and it was necessary to make only three arrests.

I want to say in connection with the mortality report of the city that many of those who died during the year were old people. Many who have spent their days at hard work on the farms or in other pursuits usually move to the cities to die. I regard much of the healthfulness of the citizens as due to the excellent quality of our water and improved sanitary conditions.

The following figures show the deaths by months: January, 46; February, 33; March, 49; April, 33; May, 30; June, 32; July, 23; August, 39; September, 32; October, 34; November 44; December, 32.

This report shows that the heaviest death rate during the year was in the month of March, while the lightest was in the month of July.

During the year 1905, Sanitary Officer Thompson had 125 homes having diphtheria within under quarantine. September had the greatest number of cases, 45, while May had none at all. Only eight homes were quarantined during the year for scarlet fever.

The one case of quarantine for smallpox occurred in April. Seventy

nuisances were abated during the year, and 157 cesspools were ordered cleaned. On the streets were found 55 dead animals. These were either cremated under some boiler in the neighborhood where found, or buried.

Plumbing Inspector Coffman was kept very busy during the year, as much work had been accomplished in the plumbing line. He made 1,037 inspections and 575 tests. He made inspections of 1,965 fixtures.

4. Diphtheria prevailed to an unusual extent, beginning the last of August and lasting until about December 1.

6. The domestic water supply from wells is small. The principal location of the wells is in the outlying districts, where there are no water mains. It seems to me that all of those wells that are situated where the city water can be used should be abandoned, as the chances for the water to be contaminated is too great to justify the continuation of the water. Well water was used in a good many cases where diphtheria prevailed. What part these conditions had to do with the disease, is hard to say. The general condition of the city has been growing better all the time. We have had a great many old rubbish and ash piles cleaned up that had been piled up for several years and nothing done to have these places cleaned and removed from the city. The city at present is in a very good sanitary condition. During the year there were 427 deaths.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 125; scarlet fever, 8. Total number of infectious diseases, 134.

CAREY, WYANDOT COUNTY.

Population, 2,300.

Person making report, Joseph F. Wonder, health officer.

1. I forced county ditch through village causing free drainage.

2. Thoroughly revised and enforced.

3. I have,

4. There was not.

6. About one-half.

I am at present writing up a new health code and expect to have same adopted by council ere long. Our village is in sanitary condition second to none in the state.

Cases of infectious diseases reported: Diphtheria, 6; scarlet fever, 7; typhoid fever, 3; measles, 2. Total number of infectious diseases, 18.

CARLISLE, NOBLE COUNTY.

Population, 125.

Person making report, W. R. Bramhall, clerk of board of health.

Cases of infectious diseases reported: Smallpox, 2; scarlet fever, 2. Total number of infectious diseases, 4.

CARROLLTON, CARROLL COUNTY.

Population, 2,000.

Person making report, Dr. A. H. Hise, health officer.

Cases of infectious diseases reported: Typhoid fever, 4; measles, 1. Total number of infectious diseases, 5.

CARTHAGE, HAMILTON COUNTY.

Population, 3,200.

Person making report, Samuel B. Gilchrist, health officer.

1. There have been no improvements made in the sanitary condition of the village except in giving more attention to cleaning gutters and general cleanliness.

2. The sanitary regulations have generally been observed, especially in regard to milk supplies and the collection of garbage.

3. Have encountered but little difficulty in enforcing the health laws. The citizens are generally willing to obey the health regulations.

4. There has been no unusual prevalence of any particular disease during the past year. The death rate shows that the health of the village has been exceptionally good. Our deaths are much less in number than for the year 1904.

5. There has been no case of cerebro-spinal meningitis reported by any of our physicians.

6. Our village water supply comes from deep wells and the amount used from private wells is so small that it is not worth considering. I do not think that there are more than 4 or five wells in the village; I know of but two that are in use.

During the past year all sanitary conditions in the village have been better observed than at any time in the past; however, there is always a chance to improve in such matters. More nuisances have been abated than formerly.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 8; typhoid fever, 1; measles, 1. Total number of infectious diseases, 11.

CASSTOWN, MIAMI COUNTY.

Population, 300.

Person making report, W. W. Baker, health officer.

Cases of infectious diseases reported: Whooping cough, 12.

CECIL, PAULDING COUNTY.

Population, 326.

Person making report, Dr. Seth E. DeMuth, health officer.

Cases of infectious diseases reported: Typhoid fever, 1; other infectious diseases, 1. Total number of infectious diseases, 2.

CEDARVILLE, GREENE COUNTY.

Population, 1,250.

Person making report, F. A. Jurkat, deputy clerk board of health.

1. The improvements have consisted in ordering wells to be drilled deeper and better secured against typhoid.

2. None.

3. Only dilatoriness on the part of some.

4. Typhoid fever in summer and autumn.

5. One death, given in report.

6. Practically all.

Cases of infectious diseases reported: Scarlet fever, 2; typhoid fever, 14; whooping cough, 1; measles, 2. Total number of infectious diseases, 19.

CELINA, MERCER COUNTY.

Population, 4,000.

Person making report, Joseph Sager, health officer.

1. Have sewered the city.

2. The board of health instituted a plan to have the garbage buried or cremated, but the council objected to it and the board had to abandon it.

3. No.

4. Smallpox prevailed in the months of April and May to the extent of 20 cases.

5. No.

6. About one-third.

Cases of infectious diseases reported: Smallpox, 20; membranous croup, 1; typhoid fever, 16. Total number of infectious diseases, 37.

CENTERBURG, KNOX COUNTY.

Population, 1,000.

Person making report, L. B. Evans, health officer.

It has been an exceptionally healthy season.

1. Nothing, except some sewerage.

2. Not any.
3. No.
4. Not in any particular.
5. Not any.
6. One hundred per cent.

Cases of infectious diseases reported:
Typhoid fever, 2.

CENTERVILLE, MONTGOMERY
COUNTY.

Population, 250.

Person making report, D. Keever,
health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. All.

Sanitary conditions good.

CHAGRIN FALLS, CUYAHOGA
COUNTY.

Population, 2,000.

Person making report, W. J. Clark,
health officer.

Cases of infectious diseases reported:
Diphtheria, 1; typhoid fever, 3. Total
number of infectious diseases, 4.

CHAMBERSBURG, GALLIA
COUNTY.

Population, 200.

Person making report, W. J. Fletcher,
M. D., health officer.

1. No improvements made.
2. Have no dairies.
3. No.
4. The health has been unusually
good past year.
5. None.
6. All depend upon wells or cisterns.

CHARDON, GEAUGA COUNTY.

Population, 1,500.

Person making report, Hervey L.
Williams, health officer.

1. No sanitary improvements with-
in last year, but council is contem-
plating construction of one or more
sewers.

2. No complaint as to milk supply.
Several complaints as to sink drains,
etc., which have received attention
upon notification. All requests of the
health officer receive prompt attention.

4. No contagious diseases prevalent
at any time.

5. No deaths from cerebro-spinal
meningitis.

6. Village has no waterworks; wells
and springs are source of water supply.

CHESTER HILL, MORGAN COUNTY.

Population, 500.

Person making report, Wm. Johnson,
health officer.

1. The sanitary conditions are good.
Careful attention has been given to
cleaning streets and alleys.

2. There are no regulations in re-
gard to milk supply.

3. There has been no difficulty in
enforcing health regulations.

4. Scarlet fever has been prevalent
during December.

6. The entire population depend on
wells for water supply.

Cases of infectious diseases reported:
Scarlet fever, 5; typhoid fever, 4;
whooping cough, 3. Total number of
infectious diseases, 12.

CHEVIOT, HAMILTON COUNTY.

Population, 1,000.

Person making report, Charles Cralg,
health officer.

1. The village has ordinances rela-
tive to the cleaning of vaults and to
drainage.

2. No regulations regarding milk; our milk supply is from several dairies keeping only a few well fed cows.

3. No trouble as yet.

4. Pneumonia was about the worst, the cases being mostly persons well advanced in years.

5. No cases of or death from cerebro-spinal meningitis.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 3; typhoid fever, 1. Total number of infectious diseases, 7.

CHICAGO, HURON COUNTY.

Population, 3,000.

Person making report, Dr. A. R. Kauffman, health officer.

Cases of infectious diseases reported: Smallpox, 1; measles, 4. Total number of infectious diseases, 5.

CHILLICOTHE, ROSS COUNTY.

Population, 17,000.

Person making report, W. S. Scott, health officer.

1. The city is at present in a fairly good sanitary condition. There have been three and two-fifths miles of sanitary sewer added to the system. Very few house connections have been made up to present time.

2. No new regulations have been enforced as regards milk supply and collection of garbage.

3. Have encountered no difficulties in enforcing the health laws, except in regard to the hog nuisance.

4. There has been no decided epidemic of contagious diseases.

5. Cerebro-spinal meningitis has not been reported within the city limits.

6. There are very few wells in use at the present time, probably not more than twenty per cent. of the population depend on well water.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 36; mem-

branous croup, 6; scarlet fever, 14. Total number of infectious diseases, 57.

CINCINNATI, HAMILTON COUNTY.

Population, 420,000.

Person making report, H. M. Millar, assistant registrar.

1. Present board of health has just come into office and is unable to speak for the work of the past board. In general, the sanitary condition has been fair.

2. There has been practically no milk inspection during the past year, but this inspection will be fully carried out during the coming year.

5. There was 51 deaths from cerebro-spinal meningitis last year.

Cases of infectious diseases reported: Smallpox, 194; diphtheria and membranous croup, 492; scarlet fever, 731; typhoid fever, 746; whooping cough, 446; measles, 263; other infectious diseases, 924. Total number of infectious diseases, 3,796.

CLARKSBURG, ROSS COUNTY.

Population, 700.

Person making report, William Ware, health officer.

1. None.

2. No.

3. No.

4. None.

6. All.

Cases of infectious diseases reported: Typhoid fever, 2; whooping cough, 18. Total number of infectious diseases, 20.

CLARINGTON, MONROE COUNTY.

Population, 900.

Person making report, T. S. Strickling, clerk of board of health.

Cases of infectious diseases reported: Typhoid fever, 2.

CLARKSVILLE, CLINTON COUNTY.

Population, 465.

Person making report, Ezekiel Cast, health officer.

1. We have, by extraordinary measures, succeeded in effecting an improvement in the cleaning of our privies; not without very considerable difficulty on account of there being two running streams on either side of our village in which some would dump the vault contents in the night, hence, I issued an order recommending the cleaning of them in the daytime, using plenty of slack lime and other disinfectants to overcome the stench, with some success.

2. There has been none.

3. Yes, in several respects (as above), and our physicians have not responded as promptly as we desired in making reports along different lines, especially that of births.

4. Only slight, in the latter part of last year, of scarlet fever of which you had some notice previously.

5. None reported.

6. Three-fourths or more.

Cases of infectious diseases reported: Typhoid fever, 2.

CLEVELAND, CUYAHOGA COUNTY.

Population, 440,000.

Person making report, Frank Combes, secretary.

Cases of infectious diseases reported: Diphtheria, 1,022; membranous croup, 29; scarlet fever, 501; typhoid fever, 305; whooping cough, 330; measles, 523. Total number of infectious diseases, 3,568.

CLEVES, HAMILTON OHIO.

Person making report, C. F. Schiele, health officer.

Cases of infectious diseases reported: Smallpox, 1; other infectious diseases, 1. Total number of infectious diseases, 2.

CLINTON, HURON COUNTY.

Population, 250.

Person making report, S. M. Sly, health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. One hundred per cent.

CLYDE, SANDUSKY COUNTY.

Population, 3,000.

Person making report, F. G. Tuttle, health officer.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 6; typhoid fever, 5; chickenpox, 11. Total number of infectious diseases, 23.

COAL GROVE, LAWRENCE COUNTY.

Population, 1,500.

Person making report, Wm. Shattuck, health officer.

1. None.

2. No.

3. No.

4. No.

6. Twenty-five per cent.

Cases of infectious diseases reported: Diphtheria, 5; membranous croup, 2; scarlet fever, 2; typhoid fever, 10. Total number of infectious diseases, 20.

COALTON, JACKSON COUNTY.

Population, 1,600.

Person making report, J. C. Duncan, health officer.

2. We order the people to gather the garbage up and then we hire teams to haul the same away.

Cases of infectious diseases reported: Diphtheria, 6; scarlet fever, 4. Total number of infectious diseases, 10.

COLLEGE HILL, HAMILTON
COUNTY.

Population, 1,400.

Person making report, J. E. Deininger, health officer.

Cases of infectious diseases reported: Diphtheria, 4; scarlet fever, 3; typhoid fever, 2; measles, 6. Total number of infectious diseases, 15.

COLUMBIANA, COLUMBIANA
COUNTY.

Person making report, A. L. McIntire, secretary of board of health.

Cases of infectious diseases reported: Typhoid fever, 8; whooping cough, 24; measles, 23; chickenpox, 3. Total number of infectious diseases, 58.

COLLINWOOD, CUYAHOGA COUNTY

Population, 6,000.

Person making report, Dr. W. H. Williams, health officer.

1. The village has made marked strides in its sanitary condition, having laid about five miles of sewers, several miles of paving, and contracts let for two years' more work.

3. No difficulty was experienced in enforcing health or sanitary laws, chiefly, I think, due to the hearty co-operation of my colleagues.

4. We had an unusually large number of typhoid and paratyphoid cases, chiefly confined to one section of the village. This section is supplied with water which is obtained from Cleveland, and first runs through the balance of the town. Consequently, I have been at a loss for a causative factor.

As I can exclude water and milk supply, which I investigated, I have laid some importance on the fact of the disturbance of soil in this locality, as extensive sewerage was going on.

6. Fully one-half of the people are using wells, but our waterworks board is fast extending the water mains.

Cases of infectious diseases reported: Diphtheria, 29; scarlet fever, 3; typhoid fever, 35; whooping cough, 7; measles, 24; other infectious diseases, 10. Total number of infectious diseases, 108.

COLUMBUS, FRANKLIN COUNTY.

Population, 180,000.

Person making report, E. A. Moriarity, clerk of board of health.

Cases of infectious diseases reported: Smallpox, 11; Diphtheria, 229; scarlet fever, 149; typhoid fever, 923; whooping cough, 78; measles, 83; other infectious diseases, 1. Total number of infectious diseases, 1,474.

COLUMBUS GROVE, PUTNAM
COUNTY.

Population, 2,000.

Person making report, J. F. Bogart, health officer.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 22; typhoid fever, 10. Total number of infectious diseases, 33.

CONGRESS, WAYNE COUNTY.

Population, 200.

Person making report, Geo. C. Essick, acting health officer.

1. No improvements in sanitary condition of town.

2. No regulation with regard to milk; town is small and garbage is disposed of by citizens in general.

4. No epidemic of any kind the past year.

5. No deaths from cerebro-spinal meningitis.

6. Entire population depends on wells for their supply of drinking water.

Cases of infectious diseases reported: Diphtheria, 1; whooping cough, 10; measles, 12. Total number of infectious diseases, 23.

CONNEAUT, ASHTABULA COUNTY.

Population, 8,000.

Person making report, O. N. Warner, health officer.

1. Board of health abolished. Ordinance passed authorizing the board of public service to act as board of health.

2. Ordinance passed regulating the sale of milk and cream.

4. There was no prevalence of any particular disease during the year.

5. One death from cerebro-spinal meningitis.

6. About 1,200 consumers of city water.

Cases of infectious diseases reported: Diphtheria, 2; membranous croup, 1; scarlet fever, 9; typhoid fever, 22; measles, 18. Total number of infectious diseases, 52.

CONTINENTAL, PUTNAM COUNTY.

Person making report, G. H. Laird, health officer.

Cases of infectious diseases reported: Typhoid fever, 5.

CONVOY, VAN WERT COUNTY.

Population, 800.

Person making report, C. D. Sidle, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 1. Total number of infectious diseases, 2.

CORNING, PERRY COUNTY.

Population, 2,000.

Person making report, Wm. Anderson, health officer.

Cases of infectious diseases reported: Membranous croup, 1; scarlet fever, 1; typhoid fever, 1; whooping cough, 9; measles, 12. Total number of infectious diseases, 21.

CORTLAND, TRUMBULL COUNTY.

Population, 800.

Person making report, L. Hutton, clerk of board of health.

1. Compelling the observance of sanitary conditions.

2. They have.

3. No great difficulty; the sanitary laws are observed better than ever before.

4. None, except measles, 35 cases.

6. All.

Cases of infectious diseases reported: Membranous croup, 2; typhoid fever, 1; measles, 35. Total number of infectious diseases, 38.

COSHOCTON, COSHOCTON COUNTY.

Population, 10,000.

Person making report, W. B. Miller, health officer.

2. Contract let for removal of all garbage commencing January 1, 1906.

6. Not over one per cent.

Cases of infectious diseases reported: Diphtheria, 31; Scarlet fever, 10; typhoid fever, 10; chickenpox, 15. Total number of infectious diseases, 66.

COVINGTON, MIAMI COUNTY.

Population, 2,000.

Person making report, W. E. Westfall, health officer.

1. A strict enforcement of the abatement of nuisances by the board and health officer.

2. None.

3. None.

4. None.

5. None.

6. About 98 per cent.

Expenditures for 1905 were \$117.10.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 7. Total number of infectious diseases, 8.

CRESTLINE, CRAWFORD COUNTY.

Population, 3,500.

Person making report, C. A. Marquart, health officer.

Cases of infectious diseases reported: Diphtheria, 4; scarlet fever, 12; measles, 7; chickenpox, 7. Total number of infectious diseases, 30.

CRESTON, WAYNE COUNTY.

Population, 1,200.

Person making report, C. A. Mellen, health officer.

1. In a general way conditions are better than previous year.

2. No trouble about collection and removal of garbage worth mentioning.

3. In no case of any moment.

4. Has been little sickness and no disease that calls special attention.

5. One.

6. 100 per cent.

CROOKSVILLE, PERRY COUNTY.

Population, 3,000.

Person making report, W. M. Cooke, health officer.

1. The village was all gone over and cleaned last year.

3. There has been no difficulty to amount to anything in enforcing laws.

4. There was no unusual prevalence of any disease.

6. Nearly all of the population depend upon wells for water.

CROTON, LICKING COUNTY.

Population, 400.

Person making report, C. B. Hempsted, health officer.

1. No improvements in sanitary condition.

2. No new regulations in regard to milk or garbage.

3. No trouble to enforce the law.

4. No unusual prevalence of any especial disease.

6. All the drinking water is supplied from wells.

CROWN CITY, GALLIA COUNTY.

Population, 250.

Person making report, James V. Stevens, health officer.

Cases of infectious diseases reported: Diphtheria, 2; scarlet fever, 6; typhoid fever, 2. Total number of infectious diseases, 10.

CUYAHOGA FALLS, SUMMIT COUNTY.

Population, 3,500.

Person making report, W. W. Scupholm, health officer.

1. People are generally responding better to requests to clean up and keep premises in proper sanitary condition.

4. There has been a prevalence of diphtheria and scarlet fever in moderate form for the last quarter of the year.

5. No cases of cerebro-spinal meningitis have been reported.

6. Three-quarters of the residents of the village use wells for water supply.

The wells are drilled from 50 to 75 feet through sand rock.

Cases of infectious diseases reported: Diphtheria, 13; scarlet fever, 5; typhoid fever, 2. Total number of infectious diseases, 20.

DALTON, WAYNE COUNTY.

Population, 800.

Person making report, Dr. D. Y. Roebuck, health officer.

1. Cleanliness.
2. No.
3. No.
4. No.
6. All.

DEAVERTOWN, MORGAN COUNTY.

Population, 1,300.

Person making report, Mr. Theodore Welch, health officer.

1. No improvement of the sanitary condition of the town has been made during the year.

2. No new regulations have been enforced and no difficulties encountered.

4. The infectious diseases that have been prevalent this year were whooping cough and chickenpox.

6. The people depend upon wells for their domestic water supply.

Cases of infectious diseases reported: Whooping cough, 12; chickenpox, 6. Total number of infectious diseases, 18.

DEFIANCE, DEFIANCE COUNTY.

Population, 9,000.

Person making report, J. D. Westrick, health officer.

The board of public service acts as board of health.

1. Not any.
2. Not any.

3. Have had no trouble.

4. No.

5. No case.

6. About 85 per cent.

Cases of infectious diseases reported: Diphtheria, 10; scarlet fever, 4; typhoid fever, 12; whooping cough, 6; measles, 3; other infectious diseases, 15. Total number of infectious diseases, 50.

DEGRAFF, LOGAN COUNTY.

Population, 1,200.

Person making report, J. W. Hendershott, health officer.

1. Since my appointment I have had no trouble to keep our town in good sanitary condition.

6. Our village is well supplied with good well water, our streets and alleys are kept clean. I have kept contagious diseases well quarantined; allowing no case to spread.

Cases of infectious diseases reported: Scarlet fever, 4.

DELAWARE, DELAWARE COUNTY.

Population, 12,000.

Person making report, O. W. Bonner, health officer.

1. We have caused to be removed all outhouses on Sandusky Street (main street), from the college, O. W. U., to court house, and made the owners of property connect with sanitary sewer.

2. Nothing new.

3. No difficulty in enforcing the law.

4. None.

5. None reported.

6. About 25 per cent.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 18; typhoid fever, 22; whooping cough, 12; measles, 16. Total number of infectious diseases, 66.

DELPHOS, VAN WERT AND ALLEN
COUNTIES.

Population, 5,000.

Person making report, Norman E. Brundage, health officer.

1. One main sanitary trunk sewer and two laterals and disposal basin.

2. No.

3. No.

4. Yes, scarlet fever, commencing in September, 1904, continuing through the winter of 1904-05 until into the summer of 1905.

5. None.

6. About 50 per cent.

Cases of infectious diseases reported: Membranous croup, 1; scarlet fever, 17; typhoid fever, 1. Total number of infectious diseases, 19.

DESHLER, HENRY COUNTY.

Population, 1,800.

Person making report, Isaac Collier, health officer.

1. Some 18-inch and some smaller sewers have been made and some other street improvements which will improve the sanitary condition.

2. No new regulations have been made in regard to the milk supply. Everybody sells milk who likes. We have one dairyman; the state inspector takes samples of his milk.

I have had some trouble enforcing the orders because we have no dump ground. The most important of the health officer's work here is to enforce the work of cleaning privies and the alleys of garbage, and getting the doctors to make their reports.

A dump ground is promised and that will facilitate matters.

6. Our entire population depend upon wells for water supply.

Cases of infectious diseases reported: Scarlet fever, 7; typhoid fever, 3; other infectious diseases, 1. Total number of infectious diseases, 11.

DILLONVALE, JEFFERSON
COUNTY.

Population, 3,000.

Person making report, H. T. Roe, clerk.

Cases of infectious diseases reported: Smallpox, 18; diphtheria, 22; membranous croup, 2; scarlet fever, 26; typhoid fever, 42; whooping cough, 12; measles, 2; other infectious diseases, 2. Total number of infectious diseases, 126.

DRESDEN, MUSKINGUM COUNTY.

Population, 1,600.

Person making report, C. W. Carter, health officer.

1. Have been very strict with vaults and drainage. Weeds have been cut twice a week during the warm months.

2. The milk has been taken from the dairy and find it all right.

4. We have not had a contagious disease this year.

6. The entire population use water from the wells.

DUBLIN, FRANKLIN COUNTY.

Population, 370.

Person making report, L. McKitrick, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 3; typhoid fever, 3; whooping cough, 12; measles, 50. Total number of infectious diseases, 68.

DUNKIRK, HARDIN COUNTY.

Population, 1,200.

Person making report, C. C. McLaughlin, health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 1; whooping cough, 20; measles, 60. Total number of infectious diseases, 82.

EAST CLEVELAND, CUYAHOGA
COUNTY.

Population, 7,000.

Person making report, J. H. Stam-
berger, health officer.

Cases of infectious diseases reported:
Diphtheria, 8; scarlet fever, 12; ty-
phoid fever, 2; measles, 2. Total num-
ber of infectious diseases, 24.

EAST LIVERPOOL, COLUMBIANA
COUNTY.

Population, 20,000.

Person making report, Dr. C. B.
Ogden, health officer.

Cases of infectious diseases reported:
Diphtheria, 27; membranous croup, 9;
scarlet fever, 24; typhoid fever, 62;
whooping cough, 28; measles, 4; other
infectious diseases, 39. Total number
of infectious diseases, 193.

EAST PALESTINE, COLUMBIANA
COUNTY.

Population, 3,000.

Person making report, Levi Neville,
health officer.

1. There have been three lines of
sewers put in and Main Street was
paved with brick.

2. No.

3. No.

4. None.

5. None.

6. About 10 per cent. use wells.

All other sanitary conditions of our
village are good.

Cases of infectious diseases reported:
Typhoid fever, 2.

EATON, PREBLE COUNTY.

Population, 3,100.

Person making report, John C. Mc-
Donald, health officer.

Cases of infectious diseases reported:
Scarlet fever, 12; typhoid fever, 14;
whooping cough, 1. Total number of
infectious diseases, 27.

EDGERTON, WILLIAMS COUNTY.

Population, 1,200.

Person making report, Calvin Hath-
away, health officer.

1. Put in drainage.

2. None, except by order of health
officer.

3. None, we have the best.

4. None.

5. None.

6. All.

Cases of infectious diseases reported:
Diphtheria, 1; scarlet fever, 1; typhoid
fever, 2. Total number of infectious
diseases, 4.

EDISON, MORROW COUNTY.

Population, 450.

Person making report, J. H. Jackson,
health officer.

1. I consider sanitary conditions
fair.

4. There have been no infectious dis-
eases; there was considerable typhoid
fever in the surrounding country, but
only one case within the corporation.

6. One hundred per cent. of popula-
tion depend upon wells for water sup-
ply.

Cases of infectious diseases reported:
Typhoid fever, 1.

ELDORADO, PREBLE COUNTY.

Population, 375.

Person making report, Geo. W. Mc-
Coy, health officer.

1. The sanitary condition of our
village has been much improved in the
past year.

3. We have had but very little
trouble in enforcing the laws. We dis-
infected the school house twice during

the year on account of threatening cases of scarlet fever.

ELIDA, ALLEN COUNTY.

Population, 500.

Person making report, S. H. Hitchcock, health officer.

1. Our village is in good condition with but few exceptions.

2. We have a clean and good milk supply and the garbage is well looked after; no complaint about either one.

3. The people are all prompt to comply with the orders of the health officer.

4. No.

5. No deaths from cerebro-spinal meningitis.

6. All depend upon wells for water supply.

Elida is one of the most healthy villages of the great state of Ohio, owing to a great extent to the clean condition in which it is kept.

The health of the people here has been excellent during the past year.

The board of health is active and is always ready and willing to do everything in its power to keep the surroundings healthy.

Cases of infectious diseases reported: Typhoid fever, 2; measles, 2. Total number of infectious diseases, 4.

ELMORE, OTTAWA COUNTY.

Population, 1,000.

Person making report, R. A. Willett, M. D., health officer.

1. During the past year there has been maintained a reasonably fair sanitary condition in this village. No infectious diseases have been reported and as a rule the general health has been very good. The high death rate is explained by the fact that most of the deaths were among the aged people.

No improvements have been made in the sanitary condition of our village during the past year.

2. No new regulations have been enforced as regards the milk supply. Collection of garbage is good.

3. We have had no difficulty in enforcing the present existing health laws.

6. The entire population depend upon wells for their water supply, but all wells are drilled into the limestone rock and cased with iron casing from the rock to the top.

ELMWOOD PLACE, HAMILTON COUNTY.

Population, 2,800.

Person making report, Dr. E. T. Busching, health officer.

1. The village council has constructed two new outlets running under the roadbed of the C. H. & D. R. R., which connect the western (or lower) portion of our village with Mill Creek. This will very materially improve the drainage of this section of our village.

2. These regulations are the same as outlined in my previous report.

3. We have encountered no very great opposition in enforcing the regulations of the health board.

4. We can say, with great pleasure, that contagious diseases have been extremely few in our midst during the past year and that we have had no deaths from the same.

5. No cases of this disease.

6. Not over one per cent., probably less. The vast majority use artesian well water supplied by Carthage, Ohio.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 1; measles, 1. Total number of infectious diseases, 3.

ELYRIA, LORAIN COUNTY.

Population, 12,000.

Person making report, G. E. French, health officer.

Cases of infectious diseases reported: Diphtheria, 14; scarlet fever, 27; typhoid fever, 16. Total number of infectious diseases, 57.

ENON, CLARK COUNTY.

Population 250.

Person making report, Frank Papert, health officer.

1. None.
2. None.
3. The people expect the corporation to attend to cleaning up.
4. No contagious diseases in the last year.

5. None.

6. All well water.

Cases of infectious diseases reported: Whooping cough, 2.

FAIRPORT HARBOR, LAKE COUNTY.

Population 2,300.

Person making report, J. H. Werbeach, marshal.

Cases of infectious diseases reported: Diphtheria, 9; membranous croup, 1; scarlet fever, 2; typhoid fever, 6; whooping cough, 21; measles, 2. Total number of infectious diseases, 41.

FARMERSVILLE, MONTGOMERY COUNTY.

Population, 600.

Person making report, W. H. Evans, health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. All.

Some wells need attention.

Cases of infectious diseases reported: Typhoid fever, 2.

FELICITY, CLERMONT COUNTY.

Population, 695.

Person making report, Charles N. Crawford, health officer.

1. Nothing.

2. No.

3. None.

4. No prevailing disease.

5. No cerebro-spinal meningitis.

6. Mostly wells, but a few good cisterns.

Health officer had the state ordinance adopted and published in local paper and hand cards distributed.

FERNBANK, HAMILTON COUNTY.

Population, 300.

Person making report, James E. Hickman, health officer.

1. No improvements.

2. No new regulations have been made.

3. Have had no difficulties.

4. None.

5. None.

6. None.

FINDLAY, HANCOCK COUNTY.

Population, 20,000.

Person making report, Amos Beardsley, health officer.

1. The sewer system has been improved very materially by the addition of several laterals. New water conduit completed, supplying the city with an abundance of pure water.

2. No.

3. Nothing unusual.

4. Nothing unusual.

5. Three.

6. Probably 50 per cent.

Cases of infectious diseases reported: Diphtheria, 35; scarlet fever, 59; typhoid fever, 23; whooping cough, 4; measles, 7; cerebro-spinal meningitis, 3; chickenpox, 32. Total number of infectious diseases, 163.

FLETCHER, MIAMI COUNTY.

Population, 400.

Person making report, J. B. Barker, health officer.

1. We have a clean village, the sanitary conditions are above the average and still improving. Our people are awake to the fact that good sanitary surroundings are essential to good health.

2. Our garbage is taken care of.

3. I have had no serious difficulty.

4. We had an unusual prevalence of whooping cough in the spring of 1905.

5. No cerebro-spinal meningitis.

6. All of our population depend upon wells for domestic water supply.

Cases of infectious diseases reported: whooping cough, 10; measles, 4. Total number of infectious diseases, 14.

FLUSHING, BELMONT COUNTY.

Population, 1,000.

Person making report, Geo. Wheeler, health officer.

1. None.

2. No.

3. No.

4. No.

5. No.

6. One hundred per cent.

Cases of infectious diseases reported: Scarlet fever, 2; typhoid fever, 2. Total number of infectious diseases, 4.

FOSTORIA, SENECA COUNTY.

Population, 9,000.

Person making report, W. N. Caldwell, health officer.

1. None.

2. No.

3. No.

4. None.

5. None.

6. 80 per cent.

Cases of infectious diseases reported: Diphtheria, 7; membranous croup, 1; scarlet fever, 7; typhoid fever, 5. Total number of infectious diseases, 20.

FRANKFORT, ROSS COUNTY.

Population, 850.

Person making report, John A. Davis, health officer.

2. No.

3. In keeping hog pens clean.

4. No.

5. One.

6. All.

FRANKLIN, WARREN COUNTY.

Person making report, John B. Miller, health officer.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 11; typhoid fever, 5; varicella, 1. Total number of infectious diseases, 20.

FRAZEYSBURG, MUSKINGUM COUNTY.

Population, 700.

Person making report, A. R. Mendenhall, health officer.

1. None.

2. No.

3. No.

4. No.

5. No.

6. One hundred per cent.

The village is, and has been in excellent sanitary condition. There has been very little sickness, and only 7 deaths, none of which could be attributed to defective sanitation.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 2. Total number of infectious diseases, 3.

FREDERICKTOWN, KNOX COUNTY.

Population, 1,000.

Person making report, Ernest V. Ackerman, M. D., clerk of board of health.

1. None.

2. No.

3. No.

4. No.

5. No cases.

6. Until the present time all have depended upon wells for domestic water supply.

But we are at present installing a water system and undoubtedly many families will put in the water for domestic use in the future.

Cases of infectious diseases reported:
Scarlet fever, 2.

 FREEPORT, WOOD COUNTY.

Person making report, I. W. Graham, health officer.

Cases of infectious diseases reported:
Diphtheria, 5; scarlet fever, 49; typhoid fever, 4; measles, 10. Total number of infectious diseases, 68.

 FREMONT, SANDUSKY COUNTY.

Population, 10,000.

Person making report, Dr. O. C. Vermilya, health officer.

1. Our sanitary improvements for the year have been mainly in a better enforcement of existing regulations; keeping paved streets cleaner, enlarging and improving our sewer system, the installation of an automatic flushing tank at the head of one long system from which there has been constant complaint from foul odors.

2. We have exercised more careful supervision of our dairies, stopped the feeding of rancid beet pulp late in the spring, insisted on all cows being turned out for fresh air a part of all

fair days. The collection of garbage is left to private collectors. We have hesitated about procuring a public dumping ground for fear of damage suits against the city by nearby residents.

3. Our citizens generally respect the regulations of our health board, but we have had trouble with some corporations which might abate their nuisances with a comparatively small effort on their part. We have had difficulty in convincing our board of service of the advisability of constructing sewers of ample capacity for our growing city and especially of trapping all intakes to avoid foul odors, of which there is a general complaint.

4. We had an epidemic of typhoid fever in July and August in a newly settled addition with small sewers, shallow surface wells and small vaults, many of which were not above the surrounding ground. A heavy rain late in May flooded this section several inches deep and undoubtedly washed fecal matter from these vaults so near the wells that in many cases the wells were contaminated by percolation of this filthy material through the loose soil. These vaults have all been cleaned, the sewerage system improved and several drilled wells put down for drinking water.

Cases of infectious diseases reported:
Diphtheria, 2; membranous croup, 1; scarlet fever, 2; typhoid fever, 50; measles, 1; itch, 3. Total number of infectious diseases, 59.

 GALION, CRAWFORD COUNTY.

Population, 9,500.

Person making report, H. H. Hartmann, health officer.

Cases of infectious diseases reported:
Scarlet fever, 32; typhoid fever, 15; whooping cough, 5; measles, 3; other infectious diseases, 4. Total number of infectious diseases, 59.

GALLIPOLIS, GALLIA COUNTY.

Population, 5,600.

Person making report, F. L. Shaw, clerk of board of health.

Cases of infectious diseases reported: Diphtheria, 4; scarlet fever, 3; typhoid fever, 5. Total number of infectious diseases, 12.

5. One death of cerebro-spinal meningitis.

6. I should judge 15 per cent. depend on wells for water supply.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 9; typhoid fever, 6; measles, 25; other infectious diseases, 1. Total number of infectious diseases, 44.

GANN, KNOX COUNTY.

Population, 400.

Person making report, J. N. House, mayor pro tem.

1. Very little.
2. None.
3. None.
4. None.
5. None.

GERMANTOWN, MONTGOMERY COUNTY.

Population, 2,000.

Person making report, William Schaeffer, health officer.

1. None.
2. No.

3. We have. The Miami Military Institute conducted by Organ Graff Brown, has drainage into a run in the west end of town. There was complaint laid in by the citizens living along the run, so we called a meeting of the board, and an investigation was ordered. I went and investigated. I found that he had two cess pools; one for receiving the refuse from the kitchen, the other the refuse from the closets of the institute building. This includes bath rooms, privies and all waste water; these cess pools overflow into a pipe drained into the above mentioned run. I reported the condition to the board and the decision was to give notice to have the nuisance abated. I notified O. G. Brown and he refused, said it was in a sanitary condition.

GARRETTSVILLE, PORTAGE COUNTY.

Population, 1,200.

Person making report, G. R. French, M. D., health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. Ninety-five per cent.

Cases of infectious diseases reported: Diphtheria, 1; measles, 1. Total number of infectious diseases, 2.

GENEVA, ASHTABULA COUNTY.

Population, 2,400.

Person making report, F. C. Smith, M. D., health officer.

1. Since our sewer system has been put in a great many outdoor closets have been removed.

2. None.
3. No.

4. Scarlet fever in November, December and January.

We intended taking action to compel him to correct the nuisance, but a new mayor has been elected, new members elected in the council and they have changed the board of health, the time of two of the members had expired, D. Huber and O. E. Emrick, they elected to fill this vacancy W. N. Schaeffer and Chas. Baker and Samuel Bausman for health officer. These proceedings not being satisfactory to the oldest members of the board, viz.: Dr. J. S. Robertson and C. S. Grimes, they

tendered their resignations, which were accepted by the mayor. Our board was considered as good a board as there was in the state, but this change was brought about by different opinions on political views. Our new mayor is a young man, also a young lawyer, admitted to the bar last autumn, he thinks it is not necessary to spend the money to send a delegate to the annual meeting of the State Board of Health, he thinks the old board was too extravagant, and had the assessment for sanitary funds reduced. So the sanitary affairs of the Miami Military Institute are in the hands of the new board; hope they will give it the proper attention.

4. There was no prevalence of any particular disease.

5. There were none.

6. They all have wells.

Cases of infectious diseases reported: Scarlet fever, 3; typhoid fever, 3. Total number of infectious diseases, 6.

GIBSONBURG, SANDUSKY COUNTY.

Population, 2,000.

Person making report, W. O. Dipman, health officer.

Cases of infectious diseases reported: Diphtheria, 4; scarlet fever, 1; typhoid fever, 6. Total number of infectious diseases, 11.

GIRARD, TRUMBULL COUNTY.

Population, 3,500.

Person making report, F. C. Hunt, health officer.

1. No.

2. No.

3. No.

4. No.

5. None.

6. Ninety per cent.

Cases of infectious diseases reported: Scarlet fever, 4; typhoid fever, 12;

whooping cough, 12; measles, 10. Total number of infectious diseases, 38.

GLENDAL, HAMILTON COUNTY.

Population, 1,500.

Person making report, Clifford Allen, health officer.

1. Sanitary conditions are very good.

3. Have no difficulty in enforcing health regulations.

6. Not more than 5 per cent. of the population depend on wells for water.

Cases of infectious diseases reported: Scarlet fever, 5.

GLOUSTER, ATHENS COUNTY.

Population, 2,360.

Person making report, H. G. Gibson, health officer.

Cases of infectious diseases reported: Diphtheria, 5; membranous croup, 1; scarlet fever, 6; typhoid fever, 10; measles, 4. Total number of infectious diseases, 26.

GORDON, DARKE COUNTY.

Population, 300.

Person making report, H. Z. Silver, health officer.

1. Our town has improved slightly in a sanitary way because of a more perfect drainage system by which well drains may connect with mains to carry off some waste water and slop.

6. All our population depend upon wells, shallow, and varying greatly in quantity of water contained at different seasons.

Cases of infectious diseases reported: Typhoid fever, 4.

GRAFTON, LORAIN COUNTY.

Population, 1,300.

Person making report, Jno. Cahill, health officer.

Cases of infectious diseases reported:
Typhoid fever, 4.

2. No.
 3. None.
 4. There were none.
 5. None.
 6. All.
-

GRAND RAPIDS, WOOD COUNTY.

Person making report, L. L. Mowan, health officer.

1. There has been no improvement in sanitary conditions this year.

2. There is no board of health and health officer has held this position so short a time the report is not very extensive. No new rules have been enforced during year.

3. There has been no difficulty in enforcing orders.

4. There was an unusual prevalence of typhoid fever during the autumn months, but no deaths resulted from it.

5. There were no cases of cerebrospinal meningitis.

6. The entire population depends on wells for water supply.

GREENVILLE, DARKE COUNTY.

Population, 7,000.

Person making report, John D. Kerlin, health officer.

Cases of infectious diseases reported:
Smallpox, 16; diphteria, 4; membranous croup, 1; scarlet fever, 5; measles, 12. Total number of infectious diseases, 38.

GROVE CITY, FRANKLIN COUNTY.

Population, 1,000.

Person making report, M. L. Hurst, health officer.

1. No material improvements. The sanitary condition of the village is fair.

GROVER HILL, PAULDING COUNTY

Population, 600.

Person making report, G. W. Morris, health officer.

Cases of infectious diseases reported:
Typhoid fever, 3; measles, 15. Total number of infectious diseases, 18.

HAMDEN JUNCTION, VINTON COUNTY.

Population, 1,100.

Person making report, E. E. Howe, marshal and health officer.

Cases of infectious diseases reported:
Diphtheria, 16; typhoid fever, 6; whooping cough, 2. Total number of infectious diseases, 22.

HAMILTON, BUTLER COUNTY.

Population, 30,000.

Person making report, Mark Millikin, M. D., health officer.

1. A sewer district has been ordered.

2. No. The new board of service will probably again use the crematory during the year 1906.

3. Not to any great extent.

4. Diphtheria very prevalent during October. I have urged the board of education and the pastors of all parochial schools to do away with drinking cups and install drinking fountains. One is in use at one of the ward schools and I think all public schools will soon be supplied.

5. One reported.

6. A very small and diminishing per cent.

Cases of infectious diseases reported: Diphtheria and membranous croup, 29; scarlet fever, 45; typhoid fever, 17; other infectious diseases, 1. Total number of infectious diseases, 92.

4. No unusual prevalence of any particular disease.

6. One hundred per cent. depend on wells for water supply. Our wells are in a bed of gravel and sand, from within one and one-half to two feet from the surface and as good as gold.

HAMLER, HENRY COUNTY.

Population, 700.

Person making report, H. L. Willard, clerk of board of health.

1. Our village is kept well cleaned.
2. None.
3. Have had no particular difficulty.
4. None except more smallpox during the winter than ever before.
5. None.
6. One hundred per cent.

Cases of infectious diseases reported: Smallpox, 9; scarlet fever, 1; typhoid fever, 3; whooping cough, 9; measles, 13. Total number of infectious diseases, 35.

HARRISON, HAMILTON COUNTY.

Population, 2,000.

Person making report, Frank Bowles, president of board of health.

The village has been extremely healthy the past year. We have had no contagious diseases in the village whatever. Not a single case has been reported to the board of health.

HARROD, ALLEN COUNTY.

Population, 410.

Person making report, John Blair, Sr., health officer.

1. Cleanliness in water system. We have had less sickness in our village this year than we have had for several years.

2. Nothing in regard to milk. We burn or bury garbage once each year.

3. None.

4. None.

5. None.

6. One hundred per cent. We have a good water supply.

HANOVERTON, COLUMBIANA COUNTY.

Population, 500.

Person making report, L. F. Ling, clerk of board of health.

1. We keep it in sanitary condition.
3. No.
4. No.
6. All.

Cases of infectious diseases reported: Typhoid fever, 1.

HARRISBURG, FRANKLIN COUNTY.

Population, 250.

Person making report, J. H. Fullen, health officer.

1. Our jail has been remodeled.
2. No regulations in regard to milk or garbage.
3. No difficulties encountered in the enforcement of law.

HARTWELL, HAMILTON COUNTY.

Population, 2,000.

Person making report, A. G. Gould, health officer.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 12; measles, 18. Total number of infectious diseases, 33.

HASKINS, WOOD COUNTY.

Population, 500.

Person making report, Dr. H. J. Johnston, acting health officer.

1. County ditch running through center of town has been sewerred and filled; street macadamized.

2. No regulations in regard to milk supply; new rule adopted to regulate the disposal of garbage from streets and alleys.

3. Not in the last year.

4. Healthy.

5. None.

6. Community depends mostly upon rock drilled and cased wells. Have had but two cases of typhoid fever the present year and both were traced to Bowling Green, Ohio.

Cases of infectious diseases reported: Typhoid fever, 2; whooping cough, 9. Total number of infectious diseases, 11.

6. All the population of the town procure water from wells; there is no other supply here.

We have one of the nicest and healthiest little towns on the Ohio river and try to keep every thing clean and up to date.

Cases of infectious diseases reported: Typhoid fever, 1; other infectious diseases, 2. Total number of infectious diseases, 3.

HILLIARDS, FRANKLIN COUNTY.

Population, 500.

Person making report, C. S. Latham, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 5; typhoid fever, 4; whooping cough, 3. Total number of infectious diseases, 12.

HICKSVILLE, DEFIANCE COUNTY.

Population, 3,000.

Person making report, Amos Farlow, health officer.

1. Water-closets are cleaned more often.

2. The collection of garbage has been rigidly enforced.

3. Have had none.

4. None, only whooping cough.

6. About 5 per cent.

Cases of infectious diseases reported: Typhoid fever, 11; whooping cough, 97. Total number of infectious diseases, 108.

HILLSBORO, HIGHLAND COUNTY.

Population, 5,000.

Person making report, J. D. McBride, M. D., health officer.

Cases of infectious diseases reported: Typhoid fever, 2.

HOLLANSBURG, DARKE COUNTY.

Population, 500.

Person making report, A. W. Meek, health officer.

The sanitary conditions of this village are good. No trouble in enforcing health code.

Cases of infectious diseases reported: Typhoid fever, 3.

HIGGINSPORT, BROWN COUNTY.

Population, 600.

Person making report, F. M. Cahill, health officer.

3. Have encountered no difficulties in enforcing the health laws.

4. There was no prevalence of any contagious disease during the year.

HOPEDALE, HARRISON COUNTY.

Population, 500.

Person making report, Elmer T. Kuhn, health officer.

There is very little to report.

There have been no improvements in the sanitary condition of the village, no unusual prevalence of any particular disease, nor any deaths from cerebro-spinal meningitis.

HOYTSTVILLE, WOOD COUNTY.

Population, 400.

Person making report, Simon P. Brentlinger, health officer.

We get pure water from drilled wells. Every thing is in very good shape here.

HUBBARD, TRUMBULL COUNTY.

Population, 1,400.

Person making report, W. S. Bond, health officer.

Cases of infectious diseases reported: Typhoid fever, 15; whooping cough, 1. Total number of infectious diseases, 16.

HURON, ERIE COUNTY.

Population, 1,800.

Person making report, S. N. Lennon, health officer.

1. None.
2. None.
4. None.
5. None.
6. One hundred per cent.

Cases of infectious diseases reported: Diphtheria, 7; scarlet fever, 1; typhoid fever, 3; whooping cough, 40; measles, 6; other infectious diseases, 15. Total number of infectious diseases, 72.

IRONTON, LAWRENCE COUNTY.

Person making report, Dr. E. E. Wells, health officer.

Cases of infectious diseases reported: Diphtheria, 61; scarlet fever, 26; ty-

phoid fever, 29; whooping cough, 3; measles, 3; other infectious diseases, 3. Total number of infectious diseases, 125.

JACKSON, JACKSON COUNTY.

Population, 5,000.

Person making report, G. W. Finney, clerk.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 12. Total number of infectious diseases, 15.

JACKSONVILLE, ATHENS COUNTY.

Person making report, Dr. C. Von Scheele, health officer.

Cases of infectious diseases reported: Typhoid fever, 2.

JEFFERSON, ASHTABULA COUNTY.

Population, 1,400.

Person making report, W. S. Andrew, health officer.

1. Good improvement has been made in the sanitary conditions of our village.

2. All milk tested.

3. Have encountered some difficulties in enforcing quarantine in scarlet fever.

6. All water supply is from wells.

Cases of infectious diseases reported: Scarlet fever, 18; typhoid fever, 4. Total number of infectious diseases, 22.

JENERA, HANCOCK COUNTY.

Population, 237.

Person making report, Chas. H. Heldman, health officer.

Cases of infectious diseases reported: Scarlet fever, 2.

JUNCTION CITY, PERRY COUNTY.

Population, 600.

Person making report, F. J. Crosbie, health officer.

1. That of drainage of low section of town and repairing of streets.

2. No new regulations as to milk supply, but there has been a new regulation as to garbage, by assistance of marshal in seeing that it is removed promptly, and none thrown in alleys or concealed.

3. Have had no difficulty whatever.

4. No.

5. No cases or deaths from cerebro-spinal meningitis in village or town-ship.

6. Ninety-five per cent. There have been no contagious diseases in our village within the last year.

 KELLYS ISLAND, ERIE COUNTY.

Population, 900.

Person making report, Henry Recker, health officer.

There has been a general epidemic of whooping cough and chickenpox in a mild form.

 KELLY'S ISLAND, ERIE COUNTY.

Population, 1,200.

Person making report, Wm. H. Kennedy, clerk of board of health.

Cases of infectious diseases reported: Typhoid fever, 1.

 KENTON, HARDIN COUNTY.

Population, 6,852.

Person making report, J. W. Hammond, health officer.

Cases of infectious diseases reported: Smallpox, 39; diphtheria, 3; membranous croup, 7; scarlet fever, 7; typhoid fever, 25; whooping cough, 20; measles, 12. Total number of infectious diseases, 113.

KIMBOLTON, GUERNSEY COUNTY.

Population, 300.

Person making report, F. M. Fowler, health officer.

1. Drainage of foul cellar.

2. No.

3. No.

4. No.

5. None.

6. All.

Cases of infectious diseases reported: Scarlet fever, 1.

 KIRBY, WYANDOT COUNTY.

Population, 150.

Person making report, Dr. E. E. Burns, health officer.

I can not make a very extended report. We have not had a death in the village during the past year. The council joins the health officer in enforcing cleanliness so far as garbage, etc., is concerned. We have had no epidemic or contagious disease, except a few cases of mumps.

 LAGRANGE, LORAIN COUNTY.

Population, 650.

Person making report, J. W. Lindsey, health officer.

1. None.

2. None.

3. No.

4. Typhoid fever, October and November; never known to have occurred here unless patient came from some city or infected district. Those having it were residents and must have contracted disease in this village.

5. None.

6. All derive their water supply from wells, average depth 25 feet; dug wells.

Cases of infectious diseases reported: Diphtheria, 4; typhoid fever, 4; whooping cough, 12. Total number of infectious diseases, 20.

LAKESIDE, OTTAWA COUNTY.

Population, 300.

Person making report, O. L. Mapes, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 3.

no report of cases of tuberculosis, measles, or whooping cough.

Cases of infectious diseases reported: Smallpox, 8; diphtheria, 22; membranous croup, 4; scarlet fever, 5; typhoid fever, 20. Total number of infectious diseases, 59.

LAKEWOOD, CUYAHOGA COUNTY.

Population, 7,000.

Person making report, A. E. McClure, M. D., health officer.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 8; scarlet fever, 10; typhoid fever, 5; whooping cough, 8; measles, 4; other infectious diseases, 8. Total number of infectious diseases, 44.

LA RUE, MARION COUNTY.

Population, 1,000.

Person making report, J. Gillespie, health officer.

Cases of infectious diseases reported: Scarlet fever, 1.

LANCASTER, FAIRFIELD COUNTY.

Population, 15,000.

Person making report, Geo. W. O'Grady, M. D., health officer.

1. In the year 1905 there were several sewers put down, but in the way of sanitary improvements nothing else has been done.

2. No regulations have been made in regard to milk supply or collection of garbage.

Diphtheria and smallpox were prevalent in the early months of 1905, and it was thought we would have quite an epidemic, but rigid quarantine regulations were established and the epidemic was gotten under control.

5. We did not have a case of cerebro-spinal meningitis reported during the year.

6. There has been quite a little talk about the impurity of our water supply, but the last analysis showed it to be usable water, 50 per cent. of the citizens use wells for domestic water supply.

All the physicians with exception of three made their report of births, and

LATTY, PAULDING COUNTY.

Population, 500.

Person making report, Robert Higginbotham, health officer.

1. A complete system of drainage.

2. There are regulations in force.

3. We have had no difficulties in enforcing the health laws or orders of the board of health.

4. Smallpox in the months of February and March, 1905.

5. No cases of cerebro-spinal meningitis have been reported to the board of health.

6. One hundred per cent. of the population.

Cases of infectious diseases reported: Smallpox, 16; scarlet fever, 1; typhoid fever, 3. Total number of infectious diseases, 20.

LAURA, MIAMI COUNTY.

Population, 378.

Person making report, Dr. S. P. Neff, health officer.

1. Improvements were only in establishing grade line and getting rid of surface drainage, putting in sinks, etc.

2. No.
3. No.
4. No.
5. None.
6. One hundred per cent.

LAURELVILLE, HOCKING COUNTY.

Population, 550.

Person making report, W. D. Cain, M. D., health officer.

Sanitary conditions good. Sewer from our swamp district productive of good results.

Cases of infectious diseases reported: Typhoid fever, 4.

LEBANON, WARREN COUNTY.

Population, 3,000.

Person making report, F. Ludlum, clerk of board of health.

Cases of infectious diseases reported: Smallpox, 2; scarlet fever, 17; typhoid fever, 2. Total number of infectious diseases, 21.

LEETONIA, COLUMBIANA COUNTY.

Population, 2,000.

Person making report, S. R. McCready, health officer.

1. In making my report for the year just closed I wish to say that unusual vigilance was maintained by the board of health to improve the sanitary condition of the town.

2. A garbage dump was secured about a mile from the town and ashes, decayed vegetation and all kinds of garbage is required to be hauled to this place to be dumped.

No hogs are allowed to be kept in the town except by a written permit from the board of health.

No new regulations have been enforced in regard to the milk supply. Nearly all the dairies have been in-

spected by the health officer. The ed in enforcing the quarantine laws, buildings and surroundings in a sanitary condition.

3. Some difficulties were encountered in enforcing the quarantine laws, and it was found necessary to make some arrests of persons for violating these laws. Guards were required at many of the houses that were under quarantine.

4. An outbreak of diphtheria and membranous croup occurred about the middle of September and kept up until the middle of December. 45 cases in all were reported with a mortality of 13. No cases of, or deaths from cerebro meningitis were reported during the year.

5. Twelve meetings of the board of health were held during the year. A sample of the water supply of the town was analyzed by the state chemist and pronounced good for drinking purposes, or domestic use. Also samples from two wells that were drilled to increase the present water supply, were analyzed with favorable results.

6. It is estimated that about one-fourth the population depend on wells for their domestic water supply. The wells, however, are being rapidly dispensed with, and town water used instead.

Cases of infectious diseases reported: Diphtheria, 28; membranous croup, 17; typhoid fever, 12; measles, 74; other infectious diseases, 3. Total number of infectious diseases, 134.

LEWISBURG, PREBLE COUNTY.

Population, 600.

Person making report, A. N. Cox, clerk of the board of health.

1. No improvements made in sanitary condition.

2. No new regulations in regard to milk supply.

3. None.

4. Typhoid fever in the fall.

5. None.

6. We depend entirely upon wells for domestic supply of water.

Our doctors do not report their cases of sickness or death to health officer.

Cases of infectious diseases reported: Typhoid fever, 6.

LEXINGTON, RICHLAND COUNTY.

Population, 600.

Person making report, J. P. Stober, M. D., health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. All.

Have excellent natural drainage, keep village clean, fine water and healthy village.

Cases of infectious diseases reported: Whooping cough, 12.

LIMAVILLE, STARK COUNTY.

Population, 200.

Person making report, O. P. Sebell, clerk of board of health.

Cases of infectious diseases reported: Whooping cough, 5.

LISBON, COLUMBIANA COUNTY.

Population, 3,000.

Person making report, David H. Bells, health officer.

2. No.
3. No.
4. None.
5. None.
6. Four-fifths.

We do not keep a record of deaths and births. We have a very healthy locality and the health officer's salary is small, so he has to work in order to support a family and only devote his extra time to garbage, sewers, vaults, etc.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 1. Total number of infectious diseases, 2.

LIMA, ALLEN COUNTY.

Population, 25,000.

Person making report, A. L. Jones, M. D., health officer.

2. Nothing new.
3. Have had no difficulty.
4. Smallpox, beginning September 29, 1904; case infected at Detroit, Labor Day; not reported until September 29, causing a general infection. Had in all 100 cases in 1904, 280 cases 1905; last case finished June 25, 1905. No cases since.
5. Three deaths from cerebro-spinal meningitis.
6. Very few wells, not 1 per cent. depend on wells.

Cases of infectious diseases reported: Smallpox, 280; diphtheria, 91; membranous croup, 16; scarlet fever, 66; typhoid fever, 14; measles, 3; other infectious diseases, 24. Total number of infectious diseases, 494.

LITHOPOLIS, FAIRFIELD COUNTY.

Population, 400.

Person making report, Felix N. Taes, acting health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 4; whooping cough, 23. Total number of infectious diseases, 28.

LOCKBOURNE, FRANKLIN COUNTY.

Population, 350.

Person making report, D. A. Kurtzhals, health officer.

1. No improvement.
2. No regulations.
3. No difficulties.
4. No.
5. No.

6. All.

Cases of infectious diseases reported:
Measles, 1.

LOCKLAND, HAMILTON COUNTY.

Population, 3,300.

Person making report, Harry Fogelman, health officer.

1. The sanitary condition of our village shows a marked improvement over the previous year, 1904. We have had less contagion and fewer deaths, the total number of deaths during the year 1904 was 48; the total number of infectious diseases, in 1904 was 51; the total number of deaths for the year ending December 31, 1905 is 42, showing a decrease of six deaths over 1904. and the total number of infectious diseases for the year ending December 31, 1905 is 29 showing a decrease of 22 cases over 1904. Our streets and alleys, gutters, etc., have been kept cleaner, our vault cleaning system has been much improved, all vault cleaners having been compelled to use inclosed tanks and contents of same taken out of the village. Our village has voted a hundred thousand dollar bond issue for a sewage disposal plant to be built the ensuing year; one of the best steps our citizens could have taken toward bettering our sanitary surroundings.

2. There are no new regulations as regards the milk supply, the garbage is collected semi-weekly in a careful manner; no complaint in this line.

3. Have had very little difficulty in enforcing the health laws or orders of the board.

4. There was prevalent in the months of April and May a slight epidemic of scarlet fever. I enforced a strict quarantine, and fumigated the public school and was able to stamp out the contagion in a short time.

5. I have had no report of any cerebro-spinal meningitis; have had a notice published in Millcreek Valley News, our weekly paper, to all practicing physicians that they must report the same to the health department.

6. The water supply for domestic use is furnished by the village of Wyoming, Ohio, through mains; there are about 20 per cent. of the population who depend upon wells. My experience as a health officer in lieu of a board of health, is that it is far better for all small villages than a local board of health; the village will get better results through this system.

Cases of infectious diseases reported:
Diphtheria, 6; scarlet fever, 18; whooping cough, 3; other infectious diseases, 2. Total number of infectious diseases, 29.

LODI, MEDINA COUNTY.

Population, 1,000.

Person making report, H. Selders, health officer.

Cases of infectious diseases reported:
Typhoid fever, 8; measles, Dutch, 20. Total number of infectious diseases, 28.

LOGAN, HOCKING COUNTY.

Population, 4,500.

Person making report, W. G. Campbell, health officer.

1. None of any importance.
2. No.
3. No.
4. No.
5. Three.
6. Seventy-five per cent.

Cases of infectious diseases reported:
Typhoid fever, 1.

LONDON, MADISON COUNTY.

Population, 3,600.

Person making report, Dr. W. H. Christopher, health officer.

1. We are putting in a sanitary (flush) sewerage system; when completed to cost about \$100,000. It is badly needed and we expect great relief in a sanitary way. It is to be com-

pleted by October 1 of present year, 1906 and from progress made so far we expect it to be ready for use at that time.

2. No new regulations in regard to milk supply, except that I am arranging to have the code recommended for village by State Board of Health, published and enforced at an early date. We have no system for collecting garbage.

3. We have had no great difficulty in enforcing the health laws, except in one instance, where dead horse were left unburied in our dump grounds. We had the offender arrested, brought before the grand jury, indicted; he plead guilty and was fined, that, together with the costs, worked the desired reformation.

4. No epidemics: In the fall of 1905 we had quite a number of cases of typhoid of rather a mild type.

5. Two deaths from cerebro-spinal meningitis, both children under three years of age.

6. We have the Holly water system and generally in use, a very small per cent. of our citizens use well water.

LORAIN, LORAIN COUNTY.

Population, 26,000.

Person making report, Edw. V. Hug, M. D., health officer.

The health board was abolished last fall and the board of public service has been acting in the capacity of health board since then.

Cases of infectious diseases reported: Diphtheria, 196; membranous croup, 2; scarlet fever, 29; typhoid fever, 29; whooping cough, 1; measles, 39; other infectious diseases, 5. Total number of infectious diseases, 301.

LORE CITY, GUERNSEY COUNTY.

Population, 775.

Person making report, Joseph Todd, health officer.

Typhoid fever, 8.

LOUDONVILLE, ASHLAND COUNTY.

Population, 1,900.

Person making report, W. S. Young, health officer.

4. Typhoid in the fall months.

6. About two-thirds of population use well water for domestic purposes.

Death rate in village for year ending 1905, is 12 2-9 per 1,000. Average age of deceased persons, 58 years, 5 months and 1 day.

LOUISVILLE, STARK COUNTY.

Population, 1,500.

Person making report, Dr. R. G. Walker, health officer.

1. The sanitary officer has visited every home twice during the year and seen to it that all closets were cleaned. Several cess pools for waste water have been built. Refuse has not been thrown in alleys and vacant lots.

A small sewer connecting with urinals of several homes was built.

2. No.

3. No.

4. No.

5. No.

6. Possibly 20 to 25 per cent.

Cases of infectious diseases reported: Diphtheria, 5.

LOVELAND, CLERMONT, HAMILTON AND WARREN COUNTIES.

Population, 1,600.

Person making report, F. H. Lever, health officer.

1. During the fiscal year ending December 31, there have been no general improvements made for the bettering of the sanitary condition of the village. However, some minor improvements in the way of ditches, cement gutters, etc., have been made.

2. There have been no new regulations passed in regard to the milk supply, and none enforced, excepting that

relating to the feeding of garbage. A regulation or ordinance for the disposal of garbage, etc., has been devised, but no final action has been taken by council as yet.

3. No special difficulty has been experienced in enforcing the orders of the board, excepting in a very few instances.

4. During the past year, as a village, we have been singularly free from infectious and contagious diseases. A very limited number of cases of diphtheria and membranous croup, with quite a sprinkling of chickenpox, constituting the whole of them. The schools have not been closed a single day on account of disease. Attention may be called to the fact that typhoid fever is comparatively a rare disease in this community, there not having been a single death reported from that cause in my almost three years of service as health officer. The most of the cases which we have had have been directly traceable to outside sources of infection. I believe this is due to the fact that over 75 per cent. of our population depend upon cistern water for domestic purposes and for drinking. It is my opinion that the majority of the wells are contaminated more or less; being situated near vaults of loose construction. As we have village waterworks under headway, it is to be hoped in the near future that we may have cement gutters on all principal streets and at least some sort of sewage system other than the surface drainage now in vogue.

Cases of infectious diseases reported: Diphtheria, 3; membranous croup, 2. Total number of infectious diseases, 5.

LOWELL, WASHINGTON COUNTY.

Population, 500.

Person making report, A. D. Newton, clerk of board of health.

We depend on wells entirely for water supply. Health of town during past year good.

Cases of infectious diseases reported: Diphtheria, 4; typhoid fever, 1. Total number of infectious diseases, 5.

LOWELLVILLE, MAHONING COUNTY.

Population, 2,000 to 2,200.

Person making report, J. H. McWilliams, health officer.

1. Our sanitary conditions are in good shape.

2. Have garbage dump; no regulations in regard to milk.

3. No.

6. All.

Cases of infectious diseases reported: Diphtheria, 2; typhoid fever, 5; whooping cough, 10; measles, 12. Total number of infectious diseases, 29.

McARTHUR, VINTON COUNTY.

Population, 1,500.

Person making report, G. W. Partlow, health officer.

Cases of infectious diseases reported: Scarlet fever, 7.

McCOMB, HANCOCK COUNTY.

Population, 1,678.

Person making report, Scott W. Preble, health officer.

1. The village is now completely sewered and drained.

2. None.

3. None.

4. None.

5. None.

6. The whole village.

Cases of infectious diseases reported: Typhoid fever, 2.

MADISON, LAKE COUNTY.

Person making report, Wm. Sneider, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 1; whooping cough, 1; measles, 7. Total number of infectious diseases, 9.

MADISONVILLE, HAMILTON COUNTY.

Population, 4,200.

Person making report, C. L. Metz, health officer.

1. No new improvements in the sanitary conditions; gutters are frequently flushed and streets scraped, etc.

2. No.

3. No.

4. Measles and chickenpox during the months of March and December. During latter part of December follicular tonsilitis.

5. No.

6. All wells were closed, none are using water from wells for domestic use.

Our town is in a most excellent sanitary condition as to streets, gutters, vaults, premises and residences.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 14; typhoid fever, 3; whooping cough, 4; measles, 16; other infectious diseases, 10. Total number of infectious diseases, 48.

MAGNETIC SPRINGS, UNION COUNTY.

Population, 350.

Person making report, Homer Waldron, clerk of board of health.

Our board of health has just been appointed.

MAGNOLIA, CARROLL AND STARK COUNTIES.

Population, 800.

Person making report, H. E. Harsh, clerk of board of health.

No disease was particularly prevalent.

No cases of cerebro-spinal meningitis.

The within report is not altogether complete as it is difficult for me to make complete report when practically nothing is reported to the health board. Deaths are not reported as they should be. The board is enforcing measures so far during 1906.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 2; typhoid fever, 4; measles, 10. Total number of infectious diseases, 17.

MALVERN, CARROLL COUNTY.

Population, 1,000.

Person making report, J. A. Rhie, health officer.

1. No improvement has been made during past year.

2. The health board's attention was called to the law governing the sale of milk, but to date no action has been taken in the matter. As stated in a previous report each family cares for its own garbage; the board having secured a piece of ground for that purpose.

3. The only difficulty encountered so far has been in physicians not reporting cases. As a rule the people obey the health board's orders without question.

4. Malvern never experienced a year and had as little sickness as 1905; only one case of typhoid fever and that a very mild one. Not a contagious disease has existed within her limits.

5. One case of cerebro-spinal meningitis resulting in death.

6. Each residence has its well; we have no public water supply.

Our town never was in a better sanitary condition than at present, with the exception of a few closets which will be attended to next spring.

MANSFIELD, RICHLAND COUNTY.

Population, 22,000.

Person making report, Dr. Jno. M. Burns, health officer.

1. There have been no improvements made in the sanitary condition of the city.

2. No new regulations made as regards the milk supply and the collection of garbage, etc.

3. We have encountered no difficulties in enforcing the health laws and orders of the board.

4. There has been no unusual prevalence of any disease during the year 1905.

5. There were three deaths from cerebro-spinal meningitis.

6. A very small per cent. of the population of the city depend on wells for a domestic water supply.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 22; scarlet fever, 6; typhoid fever, 39; whooping cough, 7; measles, 31; other infectious diseases, 6. Total number of infectious diseases, 112.

MARBLEHEAD, OTTAWA COUNTY.

Population, 1,200.

Person making report, F. H. Williams, clerk of board of health.

1. None.

2. None.

3. None.

4. There was none.

5. None.

6. Lake Erie water and cistern water is used.

Cases of infectious diseases reported: Diphtheria 6.

MARENGO, MORROW COUNTY.

Population, 286.

Person making report, I. E. Eakins, health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 4. Total number of infectious diseases, 5.

MARIETTA, WASHINGTON COUNTY.

Person making report, G. M. Magee, clerk of board of health.

Cases of infectious diseases reported: Diphtheria, 6; scarlet fever, 9. Total number of infectious diseases, 15.

MARION, MARION COUNTY.

Population, 17,000.

Person making report, William Fies, clerk of board of health.

1. Some improvements have been made such as additional sanitary sewers, disposal plant, general cleaning up, etc.

2. We have no regulations as regards the milk supply. We have as yet no ordinance regulating the collection of garbage, but I think council will adopt some system soon. Some garbage and refuse is being collected by the scavengers and cremated.

3. We have had no difficulty worth mentioning in enforcing the health rules in the city.

4. There has not been any unusual prevalence of diseases in the city except typhoid fever in a very mild form, a very small death rate from same.

5. The health officer reported one case of cerebro-spinal meningitis resulting in death.

6. I am not able to state what per cent. of the population depend on wells for a domestic water supply.

We consider the sanitary conditions of this city good, as is proven to a

certain extent at least by the low mortality rate, being about 12 to the 1,000, estimating the population at 17,000.

Cases of infectious diseases reported: Smallpox, 14; diphtheria, 4; scarlet fever, 6; typhoid fever, 124; whooping cough, 6; measles, 94; other infectious diseases, 56. Total number of infectious diseases, 304.

MARSEILLES, WYANDOT COUNTY.

Population, 500.

Person making report, E. S. Jones, M. D., health officer.

1. Streets, alleys, etc., are kept clean.

2. No.

3. No.

4. No.

5. No cases in which patient died.

6. All; 100 per cent. use drilled wells.

The best of health has prevailed the past year.

Cases of infectious diseases reported: Whooping cough, 12.

MARTINSBURG, KNOX COUNTY.

Population, 200.

Person making report, N. S. Toland, health officer.

1. No improvements as regards sanitary conditions. Our village is situated on an elevation admitting of natural drainage in all directions.

2. Garbage of all kinds is hauled away by farmers and deposited on farms.

3. No.

4. No.

6. Entire population; most of wells are drilled, are from 75 to 100 feet deep, water of excellent quality.

MARTINSFERRY, BELMONT COUNTY.

Population, 10,000.

Person making report, R. A. Linder-muth, health officer.

1. The sewerage system of our city is being extended as fast as possible.

2. No.

3. No.

4. No.

5. Yes, two deaths.

6. None.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 11; membranous croup, 1; scarlet fever, 10; typhoid fever, 32; measles, 9. Total number of infectious diseases, 64.

MASSILLON, STARK COUNTY.

Population, 14,400.

Person making report, T. Clarke Miller, health officer.

1. A good deal of paving and extension of sewers.

2. No.

3. Slackness of mayor.

4. More typhoid fever than usual, mostly in September and October.

5. None reported.

6. Perhaps one-eighth.

Our greatest annoyance is from the accumulation of garbage and offal. The board seems to lack progressive spirit and enthusiasm. Either I am too strenuous, or the board is not strenuous enough.

Cases of infectious diseases reported: Diphtheria, 23; scarlet fever, 4; typhoid fever, 45; measles, 1. Total number of infectious diseases, 73.

MAUMEE, LUCAS COUNTY.

Population, 3,000.

Person making report, Philip Hartman, health officer.

The village of Maumee is in a good sanitary condition. We have some

drilled wells but the most of them are dug; the water is good.

2. The garbage is hauled out of the village.

The sewerage of the village is good.

Our milk supply is good and our three school buildings are in a good sanitary condition.

I have been getting along better without a board of health than with one..

2. Yes.

3. Very little, only one case.

4. None.

5. None.

6. Ninety-five per cent.

Cases of infectious diseases reported:
Typhoid fever, 1.

MECHANICSBURG, CHAMPAIGN COUNTY.

Population, 1,700.

Person making report, J. C. Hathaway, health officer.

1. No change in sanitation of village.

2. No new regulations.

3. No difficulties in enforcing old regulations.

4. No prevalence of any particular disease.

5. No cerebro-spinal meningitis.

6. All depend upon wells for domestic supply of water.

Cases of infectious diseases reported:
Whooping cough, 16; measles, 4. Total number of infectious diseases, 20.

MENTOR, LAKE COUNTY.

Population, 1,000.

Person making report, J. W. Lowe, health officer.

1. The sanitary condition of the village is good with the exception of a slaughter house owned by F. E. Presley, which we seem to be unable to control or regulate.

The emptying of sewage systems into the small running streams by the owners of private residences is also one of the knotty problems.

2. There is no collection of garbage in this place. The milk is supplied from the farmers direct; we do not know of the condition of the cows. We wish some provisions for effective inspection of animals giving milk for the public could be established.

3. I have encountered great difficulty in obtaining reports from physicians as required by law. There is one physician in particular who claims that he should be paid for such service, and because of the lack of this he will report nothing.

4. No prevailing disease during the year 1905.

5. No deaths from cerebro-spinal meningitis reported.

6. We all depend upon wells for a domestic water supply.

Our failure to properly regulate the slaughter house, to prevent the pollution of living streams, to obtain reports of births, deaths and diseases from physicians are the three leading complaints from this section.

MEDINA, MEDINA COUNTY.

Population, 2,400.

Person making report, A. Pomroy, health officer.

Cases of infectious diseases reported:
Diphtheria, 5; scarlet fever, 1; typhoid fever, 7. Total number of infectious diseases, 13.

MENDON, MERCER COUNTY.

Population, 800.

Person making report, C. B. Harbauer, health officer.

1. Good cleaning up.

MIDDLE POINT, VAN WERT
COUNTY.

Population, 604.

Person making report, J. P. Swaney,
health officer.

1. One building torn down.
2. Ordinance passed.
3. Yes, in the removal of garbage,
manure, cleaning vaults, etc.
4. No.
5. None.
6. One hundred per cent.

MIDDLEPORT, MEIGS COUNTY.

Population, 3,500.

Person making report, David Sisson,
M. D., health officer.

1. The only improvement in the
sanitary condition of the village is a
considerable extension of the sewer
system, and more streets are being
paved.

2. The milk supply is furnished by
small dairies from the country, and
seems to be of good quality. No regu-
lations are observed in regard to the
matter. There is practically no regu-
lations for the collection and disposal
of garbage.

3. There has been but little diffi-
culty in enforcing the health laws or
orders of the board.

4. There was no unusual prevalence
of any disease during the year, in fact,
there was less sickness than for a num-
ber of years. It is a noticeable fact
that while the population has in-
creased, the death rate has decreased
for the past several years.

5. There were no cases of cerebro
spinal meningitis, and no cases of con-
tagious diseases except four cases of
diphtheria in one family.

6. It would be impossible to give
the per cent. of population that use
water from wells, except by a house
to house canvas. Water is being used
from wells, cisterns and hydrants.
Wells are being used less each year,
while hydrants are being used more.

Cases of infectious diseases reported:
Diphtheria, 4.

MIDDLETOWN, BUTLER COUNTY.

Population, 10,000.

Person making report, G. D. Lummis,
health officer.

1. Extension of sewers; 14 miles
now in all.
2. Health officer now uses Babcock
milk tester, and tests milk at intervals.
3. No.
4. Smallpox; 23 cases during the
summer.
5. None.
6. Very small.

Cases of infectious diseases reported:
Smallpox, 23; diphtheria, 14; scarlet
fever, 8. Total number of infectious
diseases, 45.

MIDLAND CITY, CLINTON
COUNTY.

Population, 350.

Person making report, Leonidas
Boulware, M. D., health officer.

1. There were none required.
2. No.
3. There never was opposition to
any order for improved sanitary con-
ditions.
4. None.
5. None.
6. The entire population.

We are proud to send such a favor-
able report as to deaths, health and
our excellent sanitary condition. We
hope this condition will continue for
a long period of time.

Cases of infectious diseases reported:
Diphtheria, 1.

MILAN, ERIE COUNTY.

Population, 800.

Person making report, Fred. Coll-
man, health officer.

1. Sanitary condition good, no improvements made.
2. No regulations as regards milk supply.
3. No difficulty.
4. No.
5. None.
6. Ninety-five per cent.

MILFORD, CLERMONT AND
HAMILTON COUNTIES.

Population, 1,300.

Person making report, Dr. Con W. Gatch, health officer.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 1; whooping cough, 1. Total number of infectious diseases, 3.

MILLERSBURG, HOLMES COUNTY.

Population, 2,000.

Person making report, Chas. A. Estill, health officer.

Cases of infectious diseases reported: Scarlet fever, 13.

MINERAL RIDGE, TRUMBULL
COUNTY.

Population, 11,000.

Person making report, J. M. Elden, health officer.

Cases of infectious diseases reported: Scarlet fever, 12; typhoid fever, 8; whooping cough, 10; measles, 4; other infectious diseases, 7. Total number of infectious diseases, 41.

MILFORD CENTER, UNION
COUNTY.

Population, 830.

Person making report, H. H. Knotts, health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. One-third.

MINERVA, STARK AND CARROLL
COUNTIES.

Population, 1,400.

Person making report, Arthur Thomas, health officer.

1. No improvements since last report.
2. None.
3. No.
4. A number of cases of whooping cough in February and ten cases of typhoid fever during the fall.
5. None.
6. About 25 per cent.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 10; whooping cough, 1. Total number of infectious diseases, 12.

MILLBURY, WOOD COUNTY.

Population, 300.

Person making report, C. M. Diebert, M. D., clerk and health officer.

1. No.
2. No.
3. No.
4. No.
5. None.
6. All use from drilled wells.

MINSTER, AUGLAIZE COUNTY.

Population, 1,575.

Person making report, Adam Bachman, health officer.

MORRISTOWN, BELMONT COUNTY.

Population, 352.

Person making report, A. M. Poole, health officer.

1. The streets and alleys have been kept in good condition.
2. No.
3. No.
4. None.
5. None.
6. All the population.

MORROW, WARREN COUNTY.

Population, 900.

Person making report, Dr. A. J. Koeble, health officer.

1. No improvement in the last year.
2. No.
3. No.
5. No.
6. All.

Cases of infectious diseases reported: Diphtheria, 3.

MT. BLANCHARD, HANCOCK COUNTY.

Population, 500.

Person making report, S. E. Moore, health officer.

1. We now have a board of health instead of a health officer only.

2. No.
3. No.
4. Scarlet fever in Jun.
5. None died.
6. One hundred per cent.

Cases of infectious diseases reported: Scarlet fever, 15; typhoid fever, 2. Total number of infectious diseases, 17.

MT. HEALTHY, HAMILTON COUNTY.

Population, 1,800.

Person making report, Lafayette Newfarth, health officer.

No contagious diseases reported; no typhoid fever; number of deaths, 15; percentage of deaths less than one; number of births, 32; water supply, wells and cisterns; drainage, surface.

MT. ORAB, BROWN COUNTY.

Population, 700.

Person making report, W. E. Bingham, health officer.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 1. Total number of infectious diseases, 2.

MOUNT PLEASANT, JEFFERSON COUNTY.

Population, 800.

Person making report, Henry B. Mercer, health officer.

Cases of infectious diseases reported: Smallpox, 1; scarlet fever, 3; typhoid fever, 5. Total number of infectious diseases, 9.

MT. STERLING, MADISON COUNTY.

Population, 1,200.

Person making report, Chas. T. Gallagher, M. D., health officer.

1. Surface drainage has been improved by completing a number of gutters, and the building of a few cess pools has lessened the pollution of water drains.

2. No.
3. No.

4. Yes typhoid fever during the fall and early winter of 1905.

5. No cases.

6. Not over 10 per cent.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 8. Total number of infectious diseases, 9.

MT. VERNON, KNOX COUNTY.

Population, 10,000.

Person making report, H. W. Blair, M. D., health officer.

1. A large number of houses and business blocks have been connected with the sewer.

2. Garbage has been collected more thoroughly than before.

3. We have had no difficulty in enforcing the rules of the board. Altogether it has been a good year.

Cases of infectious diseases reported: Diphtheria, 12; scarlet fever, 4; typhoid fever, 4; measles, 2; chickenpox, 25. Total number of infectious diseases, 47.

MT. WASHINGTON, HAMILTON COUNTY.

Population 800.

Person making report, W. C. Langdon, M. D., health officer.

Village has good natural drainage; about one-sixth of the population depend on well water for use.

Have no system of garbage disposal and have no trouble in enforcing health laws.

Cases of infectious diseases reported: Scarlet fever, 8.

MURRAY CITY, HOCKING COUNTY.

Population, 1,300.

Person making report, T. J. Dillinger, health officer.

The village of Murray City has had no epidemics of any contagious or infectious disease during the past year. It has been hard on the doctors but a great blessing to the people at large.

1. We have waterworks in our village and sidewalks over the main part of town which helps sanitary conditions.

2. We have made no new regulations within the past year.

4. No pestilential disease has stalked through our village for more than one year.

5. There has been no case of cerebro spinal meningitis in our village.

6. About 90 per cent. of our population use well water exclusively.

We hope to banish the pig and his sty from our village during the next year.

We also expect to pave and pike our two main streets of the village within this year, 1906. This will give us better drainage and a chance to make a cleaner town.

We have been making citizens haul all manure and garbage out of village and we hope to reach nearer the goal of cleanliness each and every year.

We ought to improve our sanitary laws so we could enforce them to a certainty in every violation.

Sanitary conditions can only be perfected as we educate our people to be clean. Much of this education can be acquired in school if the teacher is up-to-date and instills principles of neatness and cleanliness into his pupils' minds and sets the proper example.

Cases of infectious diseases reported: Diphtheria, 2; scarlet fever, 5; typhoid fever, 2; whooping cough, 1. Total number of infectious diseases, 10.

NAPOLEON, HENRY COUNTY.

Population, 5,000.

Person making report, George W. Cocke, health officer.

1. There have been no improvements made whatever.

2. There have been no regulations as regards the milk supply.

3. I have encountered considerable difficulty in moving slaughter house, parties will not comply with orders.

4. None.

5. None.

6. Two-thirds of population depend on wells for water.

I have done all in my power to get things in good condition, but so far the health board has taken no action whatever.

Cases of infectious diseases reported:
Scarlet fever, 3; typhoid fever, 1;
whooping cough, 1; measles, 1. Total
number of infectious diseases, 6.

NASHVILLE, HOLMES COUNTY.

Population, 300.

Person making report, David Parks,
health officer.

There were no deaths in the village
during the year.

NAVARRE, STARK COUNTY.

Population, 1,100.

Person making report, John Bailiss,
health officer.

1. The village is in first-class sani-
tary condition.
 2. None.
 3. None at all.
 4. None.
 5. Two.
-

NELSONVILLE, ATHENS COUNTY.

Population, 7,000.

Person making report, Nathan Hill,
health officer and clerk.

1. Only in enforcing health laws.
2. No regulations regarding milk
supply.

New ground leased for garbage.

3. No.
4. No.
5. No.
6. But very few.

Cases of infectious diseases reported:
Diphtheria, 4; scarlet fever, 15; ty-
phoid fever, 4. Total number of in-
fectious diseases, 23.

NEVADA, WYANDOT COUNTY.

Population, 1,000.

Person making report, H. E. Dwire,
health officer.

Our people all depend on wells for
water supply, but most of them have
driven wells and receive their supply
from the rock.

I have had no difficulty in enforcing
health laws except in the matter of
cess pools which I expect will be ad-
justed soon.

NEWARK, LICKING COUNTY.

Population, 26,050.

Person making report, Clark B.
Hatch M. D., health officer.

Cases of infectious diseases reported:
Membranous croup, 2; scarlet fever,
1; typhoid fever, 8; whooping cough,
3; other infectious diseases, 11. Total
number of infectious diseases, 25.

NEW BREMEN, AUGLAIZE COUNTY.

Population, 2,000.

Person making report, Dr. E. M.
Phelps, health officer.

The sanitary condition of the town
has improved greatly in the last year,
there having been but two complaints
filed this year and these were at once
rectified. The streets, gutters and
alleys were kept in good condition and
were inspected monthly either by my-
self or the marshal. The school build-
ings were inspected and found in good
condition. About 90 per cent. of the
people have their own wells, but they
are slowly beginning to use city water
of which we have plenty and, as shown
by analysis, to be of excellent quality.
The general health has been good,
there were but three cases requiring
care, two of typhoid fever and one of
scarlet fever, all of which made good
recovery. The proper precautions were
taken by attending physicians as to
fumigation and in scarlet fever case
the house was quarantined, also three
houses where there were exposures to
said disease. The people here take the
right view of quarantining now, and

I think and hope we will have no epidemics and if we should we can handle things without any danger of their trying to break out of quarantine. I had the two sections of State laws with regard to people sick and also exposed to contagious diseases published in the papers here so that everybody would know what should be done in cases of that kind.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 2. Total number of infectious diseases, 3.

NEWBURG, CUYAHOGA COUNTY.

Population, 6,000.

Person making report, C. L. McCoy, M. D., health officer.

1. We have greatly improved the sanitary conditions of our city. No one is allowed to dispose of his own night soil or allow a closet to empty into streams, ponds or low places. Sanitary vaults or cesspools are required, dead animals cremated or buried, etc.

2. We have no regulations governing milk supply. Garbage is not allowed to collect so as to become a nuisance.

3. We have trouble in getting doctors to report diseases, births and deaths.

4. Had but few diseases of any kind during 1905.

5. Did not have but one case in our city.

6. Fifty per cent. or more.

Cases of infectious diseases reported: Diphtheria, 6; scarlet fever, 3; typhoid fever, 10; whooping cough, 21; measles, 4; mumps, 2. Total number of infectious diseases, 46.

NEWCOMERSTOWN, TUSCARAWAS COUNTY.

Population, 3,500.

Person making report, Wm. Tidrick, health officer.

1. No special improvements have been made in the sanitary condition of our city.

2. No new regulations in regard to milk supply, or collection of garbage have been made.

3. No difficulties have been encountered in enforcing the health laws.

4. The most prevalent disease was typhoid fever during late summer and fall.

5. No deaths from cerebro-spinal meningitis.

6. At least 75 per cent. depend upon wells for domestic water supply.

Cases of infectious diseases reported: Scarlet fever, 7; typhoid fever, 22; measles, 5. Total number of infectious diseases, 34.

NEW LEBANON, MONTGOMERY COUNTY.

Population, 190.

Person making report, Lutie Piatt, health officer.

1. No improvements.

2. No new regulations have been enforced.

4. No unusual prevalence of any disease.

5. No deaths from cerebro-spinal meningitis.

6. One hundred per cent. depend on wells for a domestic water supply.

NEW LEXINGTON, PERRY COUNTY.

Population, 2,000.

Person making report, John W. Holden, health officer.

1. None.

2. None.

3. No.

4. Diphtheria and typhoid fever during the fall and winter.

5. None.

6. About 75 per cent.

Cases of infectious diseases reported:

Diphtheria, 23; membranous croup, 1; typhoid fever, 12. Total number of infectious diseases, 36.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 6; typhoid fever, 3; whooping cough, 3. Total number of infectious diseases 13.

NEW LONDON, HURON COUNTY.

Population, 1,500.

Person making report, A. M. Turner, health officer.

1. Our village is in first-class sanitary condition.
2. There have not been any regulations made in regard to milk supply.
3. We have not.
4. Smallpox from May 1 to July 10.
6. All in the village.

Cases of infectious diseases reported: Smallpox, 40; diphtheria, 1; scarlet fever, 2; typhoid fever, 4; measles, 5. Total number of infectious diseases, 52.

NEW PARIS, PREBLE COUNTY.

Population, 800.

Person making report, G. L. Lyne, M. D., health officer.

1. None; sanitary conditions good.
2. General order for collection of garbage and cleaning of alleys, water closets, cesspools etc.
3. No.
4. No.
5. None.
6. About 100 per cent.

Cases of infectious diseases reported: Whooping cough, 6.

NEW MADISON, DARKE COUNTY.

Population, 600.

Person making report, Jesse E. Jones, health officer.

1. Cleanliness.
2. No.
3. I have not.
4. No.
5. None.
6. About 100 per cent.

NEW PHILADELPHIA, TUSCARAWAS COUNTY.

Population, 9,000.

Person making report, Geo. H. Peck, M. D., health officer.

1. None.
2. No.
3. No.
4. Diphtheria.

Cases of infectious diseases reported: Diphtheria, 73; scarlet fever, 25; typhoid fever, 8. Total number of infectious diseases, 106.

NEW MATAMORAS, WASHINGTON COUNTY.

Population, 800.

Person making report, Geo. Springer, health officer.

Our sanitary condition is moderate and we are trying to bring it up as near to perfection as possible. Our mayor is wide awake in this matter and I have his hearty co-operation. Our doctors seem to do what they can along this line. Our waterworks are in good condition. Sewerage is also in good shape.

NEW RICHMOND, CLERMONT COUNTY.

Population, 2,000.

Person making report, J. A. Windsor health officer.

1. None.
2. No.
3. No.
4. No.
5. None.
6. None.

Cases of infectious diseases reported:
Diphtheria, 1; typhoid fever, 30. Total
number of infectious diseases, 31.

NEW RIEGEL, SENECA COUNTY.

Population, 300.
Person making report, Anthony
Imber, health officer.
3. None.
4. None.

NEW STRAITSVILLE, PERRY COUNTY.

Population 2,500.
Person making report, Robert Beil,
health officer.

Cases of infectious diseases reported:
Diphtheria, 2; membranous croup, 5;
typhoid fever, 10; whooping cough, 15;
Total number of infectious diseases, 32.

NEWTON FALLS, TRUMBULL COUNTY.

Population. 780.
Person making report, H. M. Mealy,
M. D., health officer.
Cases of infectious diseases reported:
Scarlet fever, 1; typhoid fever, 1. To-
tal number of infectious diseases, 2.

NEWTOWN, HAMILTON COUNTY.

Population, 700.
Person making report, Dr. T. B.
Mulloy, health officer.
2. No new regulations have been
enforced as regards the milk supply,
the collection of garbage, etc.
3. Have had no difficulty in enforce-
ing the health laws or orders.
4. There was no unusual prevalence
of any particular disease during the
year.

6. We depend entirely upon wells
for a domestic water supply.

NEW VIENNA, CLINTON COUNTY.

Population 800.
Person making report, Geo. R.
Leonard, health officer.
1. Not any.
2. No.
3. The very mild form of scarlet
fever made it very difficult to recognize
and control.
4. No.
5. Not any.
6. About 75 per cent.

Cases of infectious diseases reported:
Scarlet fever, 22.

NEW WATERFORD, COLUMBIANA COUNTY.

Population, 700.
Person making report, Edwin R.
Birch, health officer.
1. Our village has made no great
improvement in the sanitary con-
ditions other than enforcing ordi-
nances for the removal of refuse mat-
ter and the disposing of dead animals.
2. No ordinances made for the milk
supply or garbage. People being noti-
fied about the removal of offensive
matters are, as a rule, willing to com-
ply.
4. No particular disease was preva-
lent during the year.
5. No deaths from cerebro-spinal
meningitis.
6. The entire population of the vil-
lage depend on wells for water supply.

NEW WESTON, DARKE COUNTY

Population, 325.
Person making report, A. Pearson,
M. D., health officer.

1. No special sanitary work was done except some changes in drainage.

2. None.

3. None; orders to clean up where necessary were promptly obeyed.

4. None.

5. None.

6. About 50 per cent. use wells and 50 per cent. cisterns.

Our water supply from wells in the earth less than 58 feet deep is bitter, containing sulphur, magnesia and iron, having the taste of sulphate of magnesia and sulphate of iron in one-half to 1 per cent. solution and has about the same effect on the alimentary canal. One to two pints of it makes a fair cathartic for those not at all accustomed to it. Recently many wells have been drilled 10 to 20 feet in the silicate of lime rock, and much better water is obtained, but still this contains traces of the bitter water. The earth here is unusually impervious to water and none is obtained except in a thin strata of gravel immediately on the rock or by drilling into the rock, which lies 58 to 62 feet below the surface. Many dry holes have been sunk to the rock. All new wells are now sunk into the rock. We have much less stomach and bowel troubles since we have more "rock wells" than before, and less typhoid fever the last four years. Cisterns were largely in use before drilled wells were made here and many still use them.

We have had no epidemic of any disease this year and much less sickness than for any one of the last ten years.

Cases of infectious diseases reported:
Typhoid fever, 2.

NORTH AMHERST, LORAIN COUNTY.

Population, 1,800.

Person making report, Washington Foster, health officer.

1. The hog nuisance has been removed.

2. There never has been any regulation as to the milk supply or inspection of dairies; the council advertised for garbage collector, but no applications were received.

3. The most difficulty arose in enforcing the hog ordinance caused by ignorance and stubbornness.

4. Typhoid fever was quite prevalent during November and December.

5. One case and one death from cerebro-spinal meningitis.

6. North Amherst depends on wells for water supply.

The sanitary condition of our village is bad.

Cases of infectious diseases reported:
Diphtheria 1; typhoid fever, 11; whooping cough, 5. Total number of infectious diseases, 17.

NORTH BALTIMORE, WOOD COUNTY.

Population, 3,500.

Person making report, J. W. Stoner, health officer.

1. None.

2. No.

3. No.

4. No.

5. One.

6. A very large majority of our population use water from drilled wells, largely because of the bad taste of the hydrant water.

Cases of infectious diseases reported:
Scarlet fever, 2.

NORWALK, HURON COUNTY.

Population, 8,500.

Person making report, E. Martin, health officer.

1. Council has entered into a contract with E. G. Bradbury, consulting engineer, of Columbus, to prepare complete plans for sanitary sewerage and sewage disposal plant.

2. Night soil now collected under contract and no other person allowed to dispose of same.

3. Had no difficulty as to enforcing regulations.

4. Had no particular epidemic of disease and general health of city has been extra good.

6. Waterworks water, mostly from springs, furnishes drinking water to the larger part of the population.

Cases of infectious diseases reported: Diphtheria, 4; membranous croup, 1; scarlet fever, 6; typhoid fever, 8; whooping cough, 1. Total number of infectious diseases, 20.

NORWOOD, HAMILTON COUNTY.

Population, 12,000.

Person making report, J. C. Cadwallader, M. D., health officer.

1. Streets are kept cleaner.

2. None.

3. No.

4. No.

5. None.

6. Twenty per cent.

Cases of infectious diseases reported: Smallpox, 3; diphtheria, 16; scarlet fever, 17; typhoid fever, 8; whooping cough, 1. Total number of infectious diseases, 45.

NOTTINGHAM, CUYAHOGA COUNTY

Population, 1,400.

Person making report, W. O. Jenks, health officer.

1. In sanitary matters Nottingham stands about where it has stood for many years. What we need here, in a sanitary way, is a good system for the general supply of pure water, a good number of well laid sanitary sewers and a sewage reduction plant.

2. Our milk supply comes from milk that has been inspected in other villages by their boards of health.

Some of our people keep cows and sell their milk to their near neighbors, this milk is superior to that supplied by the vendors. Garbage is hauled away as manure.

As we have no sanitary sewers, all of the small streams leading to the lake are badly polluted by sink water, soap suds, etc. With the rapid increase of population that obtains in this village will come increased difficulty in keeping clear from garbage accumulation, soil and stream pollution and an infected water supply. So in the future the health reports from this vicinity will not compare with the present favorable one.

3. No especial difficulty has been encountered by the board of health in enforcing health laws, although certain nuisances are hard to abate, such as those caused by stock trains passing through the village freshly flushed, and dripping with all kinds of offensive offal. Railway corporations show a laudable disposition in the main to conform to health laws, but the exigencies of their business and the carelessness of employes, bring up some hard health propositions to solve during hot weather.

4. We have had quite an extensive epidemic of measles, traced to one case that came from Canada and infected the schools. The epidemic was mild and no deaths occurred on account of it.

6. In regard to our water supply, we depend entirely on wells and filtered cisterns for drinking purposes, although some of our people buy bottled water for drinking during the summer.

Cases of infectious diseases reported: Typhoid fever, 4; measles, 52. Total number of infectious diseases, 56.

OAK HILL, JACKSON COUNTY.

Person making report, Wm. Jenkins, health officer.

1. Not any.

2. None.
3. Some in regard to closets.
4. Whooping cough.
5. Two.
6. All.

Cases of infectious diseases reported: Diphtheria, 3; membranous croup, 4; whooping cough, 50; measles, 25; other infectious diseases, 25. Total number of infectious diseases, 107.

OAKLEY, HAMILTON COUNTY.

Population, 900.

Person making report, W. E. Seilkop, clerk of board of health.

1. The first sewer was constructed along the main thoroughfare last year, which was needed badly.

2. No new regulations in regard to milk supplies have been made. All dairies here deliver milk to the city of Cincinnati and their inspector examines them also.

3. We have had no difficulties in enforcing the health laws.

4. The two cases of smallpox reported last spring were of a very mild form.

5. There were no cases of cerebro-spinal meningitis.

Cases of infectious diseases reported: Smallpox, 1; membranous croup, 1; measles, 2. Total number of infectious diseases, 4.

OAKWOOD, PAULDING COUNTY.

Population, 500.

Person making report, Allen Black, health officer.

1. In the way of cleaning up.
2. Yes, in regard to garbage.
3. Not any.
4. None.
5. None.
6. All.

OBERLIN, LORAIN COUNTY.

Population, 4,900.

Person making report, E. L. Burge, health officer.

Cases of infectious diseases reported: Diphtheria, 2; typhoid fever, 2; measles, 1. Total number of infectious diseases, 5.

OHIO CITY, VAN WERT COUNTY.

Population, 800.

Person making report, C. A. Ballet, health officer.

Cases of infectious diseases reported: Scarlet fever, 1.

OLMSTED FALLS, CUYAHOGA COUNTY.

Population, 413.

Person making report, H. B. Northrop, health officer.

1. None.
 2. No.
 3. No.
 4. No.
 5. None.
 6. All.
-

ORRVILLE, WAYNE COUNTY.

Population, 2,200.

Person making report, A. A. Brooks, health officer.

With a complete sewer system we would be all right.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 26. Total number of infectious diseases, 27.

OSBORN, GREENE COUNTY.

Person making report, Ora Beakler, health officer.

1. Have not made any improvements.

2. There have been no regulations enforced in regard to milk supply.

3. No.

4. No.

5. No.

6. The whole population depends upon wells for a domestic water supply.

Cases of infectious diseases reported: Scarlet fever, 2; typhoid fever, 3. Total number of infectious diseases, 5.

OSGOOD, DARKE COUNTY.

Population, 300.

Person making report, W. F. Davidson, health officer.

Cases of infectious diseases reported: Typhoid fever, 1.

OSTRANDER, DELAWARE COUNTY.

Population, 500.

Person making report, G. E. Cowles, health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. Twenty-five per cent.

Cases of infectious diseases reported: Typhoid fever, 1.

OTTAWA, PUTNAM COUNTY.

Population, 2,300.

Person making report, Frank Light, health officer.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 3. Total number of infectious diseases, 10.

OTTOVILLE, PUTNAM COUNTY.

Person making report, J. T. Ockuly, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 6. Total number of infectious diseases, 4.

OXFORD, BUTLER COUNTY.

Population, 2,300.

Person making report, W. E. Calohan, health officer.

1. The village has made a great many changes in the streets and gutters and caused about one and one-half miles of concrete gutter to be put in, which carries the water off and keeps the streets in a better condition than they have been for years past.

2. We have the usual way of collecting garbage in barrels and hauling it off.

3. No.

4. No.

5. No.

6. About one-third of our population use wells for water.

Cases of infectious diseases reported: Diphtheria, 2; scarlet fever, 5. Total number of infectious diseases, 7.

PAINESVILLE, LAKE COUNTY.

Population, 6,000.

Person making report, S. A. Haskell, health officer.

1. Extending the sanitary and storm water sewers and paving.

2. No.

3. But little.

4. Diphtheria during late spring time.

5. No.

6. Sixty-two and one-half per cent.

Cases of infectious diseases reported: Diphtheria, 19; membranous croup, 1; scarlet fever, 4; typhoid fever, 10; whooping cough, 5; measles, 7; other infectious diseases, 1. Total number of infectious diseases, 47.

PALESTINE, DARKE COUNTY.

Population, 300.

Person making report, T. L. North, M. D., health officer.

There has been considerable indifference toward quarantine laws in this village, also in township for which I was health officer up to a few months ago.

We have had five cases of scarlet fever recently and the protests against the regular enforcement of the law were carried to the point that a quarantine card was taken down twice by persons having no authority; also the fumigation of a house, the liberation of a patient and the absolute refusal of the physician to make a report to the health officer.

6. All use wells.

Cases of infectious diseases reported: Scarlet fever, 5; typhoid fever, 2. Total number of infectious diseases, 7.

PAYNE, PAULDING COUNTY.

Population, 1,356.

Person making report, Dr. G. W. Bodey, health officer.

Cases of infectious diseases reported: Smallpox, 4; typhoid fever, 12. Total number of infectious diseases, 16.

PEEBLES, ADAMS COUNTY.

Population, 850.

Person making report, G. F. Thomas, health officer.

1. None.

2. No.

3. Physicians do not report their cases.

4. No.

6. All.

Cases of infectious diseases reported: Membranous croup, 3; typhoid fever, 6; whooping cough, 30. Total number of infectious diseases, 39.

PERRYSBURG, WOOD COUNTY.

Population, 1,800.

Person making report, James H. Hayes, health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 3. Total number of infectious diseases, 4.

PHILO, MUSKINGUM COUNTY.

Population, 850.

Person making report, Rees Mercer, health officer.

Cases of infectious diseases reported: Scarlet fever, 1.

PIKETON, PIKE COUNTY.

Population, 650.

Person making report, Andrew Martin, health officer.

1. None.

2. None.

3. Have had trouble with Patterson Milling Company. They have a hog lot in connection with mill in the corporation causing quite a stench and complaint has been made by the citizens. They have been indifferent to instructions of the health board.

4. No.

5. None reported.

6. Ninety per cent. The supply of water is excellent, mostly from drove wells 35 to 40 feet deep in the river gravel.

PIONEER, WILLIAMS COUNTY.

Population, 800.

Person making report, A. F. Morris, health officer.

1. The village sanitary conditions are good.

2. No.

3. No.

4. In November, scarlet fever, but was soon stamped out.

6. All.

Cases of infectious diseases reported:
Scarlet fever, 2.

PIQUA, MIAMI COUNTY.

Population, 13,000.

Person making report, F. E. Kitzmiller, health officer.

Cases of infectious diseases reported:
Scarlet fever, 3; typhoid fever, 25; whooping cough, 50; measles, 25. Total number of infectious diseases, 103.

PLEASANT CITY, GUERNSEY COUNTY.

Population, 1,100.

Person making report, J. W. Trott, health officer.

1. Improvements consist chiefly in removal of garbage and sewage which had not been disposed of previous to my appointment.

2. We have no dairy from which milk is obtained, the people depending upon divers families for their milk.

The garbage must be disposed of once every month at least, and sooner if necessary.

3. None whatever.

4. The year 1905 has been an exceptionally healthy one. Of all the infectious diseases, typhoid fever cases were most numerous, and not over twenty cases of that, there being but one case of diphtheria and one of scarlet fever in the village.

5. No cases of cerebro-spinal meningitis.

6. Entire population depends upon wells for water supply.

Cases of infectious diseases reported:
Diphtheria, 1; scarlet fever, 1; typhoid fever, 20. Total number of infectious diseases, 22.

PLEASANT HILL, MIAMI COUNTY.

Population, 700.

Person making report, Daniel Brown, health officer.

2. No.

3. No.

4. Whooping cough.

6. All.

PLEASANT RIDGE, HAMILTON COUNTY.

Population, 1,200.

Person making report, C. W. Acomb, health officer.

1. No particular improvements have been made in the sanitary condition of our village, except more modern houses are being built, and more care is observed in sanitary construction of same, but until we have a sewerage system, conditions will not be altogether satisfactory.

2. We believe our milk supply is in good hands, and comes from clean dairies and healthful surroundings.

The garbage question is still unsolved on premises; streets are kept clean, refuse of all kinds is regularly hauled away.

3. Have had no trouble enforcing health laws as I find citizens ready when called to account for any violations of said laws, to remedy at once any neglect on their part.

4. There has been no prevalence of any particular disease, although we have had six cases of diphtheria during the year. The first case developed last March, an adult person, and since September four children, only one of school age, and of different families, have been affected. Antitoxin was used in all cases.

5. No.

6. About ten per cent. of our population use wells. The larger number uses water from Cincinnati, Ohio, piped from waterworks there.

Cases of infectious diseases reported:
Diphtheria, 6; typhoid fever, 1. Total
number of infectious diseases, 7.

Cases of infectious diseases reported:
Typhoid fever, 3; whooping cough, 4.
Total number of infectious diseases, 7.

PLYMOUTH, RICHLAND COUNTY.

Population, 1,170.

Person making report, George J. Searle, M. D., health officer.

1. None, except by appointment of health officer in lieu of board of health.

2. No.

3. Yes, we have no sewers, but depend upon cesspools and privies. Cesspools overflow and owners thereof wish to tile the overflow into the public ditch which flows into Huron River. Some privies are set on top of the ground, owners do not clean them out only when compelled to by threats.

Doctors do not report cases of contagious or infectious diseases, except in a few instances, never report births. Undertaker buried the dead without a permit in one instance. Business men think the street gutters are for their convenience to pour their slops into.

4. No.

5. None.

6. About ninety per cent.

I have great trouble to obtain news of infectious and contagious diseases, cannot depend upon the physicians to notify the health officer. With the exception of whooping cough and a few cases of typhoid fever, we have been free from above named diseases. It is difficult to impress upon the minds of owners of buildings which are rented as residences, the necessity of keeping the cesspools and privy vaults clean, and that the health of the community depends upon cleanliness and pure water.

There is now in course of construction a well about twenty feet in diameter and fourteen feet deep, the floor of which is bed rock. This well is placed at the foot and east of a hill, water flows into the well at junction of soil and rock.

POLAND, MAHONING COUNTY.

Population, 500.

Person making report, C. R. Justice, health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. All.

Cases of infectious diseases reported:
Diphtheria, 2; scarlet fever, 4; typhoid fever, 5; measles, 10. Total number of infectious diseases, 21.

POMEROY, MEIGS COUNTY.

Population, 4,700.

Person making report, J. A. Miller, health officer.

1. We have the gradual displacement of vaults by the water flush tanks.

2. The garbage is being taken care of twice a week by garbage haulers. The cost of same paid by the property occupants.

3. No.

4. We had several cases of meningitis during the early part of the year, 5 deaths from same. Scarlet fever was confined to two families. We had a number of cases of pertussis the first part of the year. The typhoid fever was much lighter than for many years.

6. We have very few wells, mostly cisterns and city water supply.

It has been the one aim of the health department to urge cleanliness.

Cases of infectious diseases reported:
Scarlet fever, 5; typhoid fever, 8; whooping cough, 30. Total number of infectious diseases, 43.

PORTAGE, WOOD COUNTY.

Population, 600.

Person making report, Elmer D. Quaintance, health officer.

1. Sewers have been constructed along two streets and four catch basins in other parts of corporation.

2. No.

3. No.

4. No.

5. No.

6. The water supply is from wells exclusively.

 PORT JEFFERSON, SHELBY COUNTY.

Population, 400.

Person making report, D. J. Cargill, health officer.

I am very much delighted in saying to you that we have had no deaths within the past year, nor any diseases of an infectious nature.

 PORTSMOUTH, SCIOTO COUNTY.

Population, 22,000.

Person making report, John W. Bendt, clerk of board of health.

1. None.

2. No.

3. No.

4. No.

5. No.

6. None.

Cases of infectious diseases reported: Smallpox, 5; diphtheria, 30; membranous croup, 1; scarlet fever, 22; Total number of infectious diseases, 58.

 PROCTORVILLE, LAWRENCE COUNTY.

Population, 525.

Person making report, R. E. Atkinson, health officer.

The board of health of Proctorville had but little to do in the year 1905 as we had no contagious diseases.

Ordered a few nuisances abated, such as closets, offensive hog pens, etc., is all that was done.

Cases of infectious diseases reported: Scarlet fever, 2.

 PROSPECT, MARION COUNTY.

Population, 1,100.

Person making report, G. F. Gast, health officer.

Cases of infectious diseases reported: Typhoid fever, 1; whooping cough, 1; measles, 69. Total number of infectious diseases, 71.

 PUT-IN-BAY, OTTAWA COUNTY.

Population 350.

Person making report, Adam Heidle, health officer.

1. There has been no great improvement made in the sanitary condition of our village. Several wells located near cesspools have been abandoned.

2. Have enforced no new regulations regarding milk supply, garbage collection, etc.

3. Have had no difficulties in enforcing the health laws or orders of the board.

4. There was no unusual prevalence of any particular disease during the year, in fact, we have had a very healthful year as our mortality report will show.

5. No cases or deaths of cerebrospinal meningitis.

6. Estimated percentage of population depending on wells for a domestic water supply, twenty.

QUAKER CITY, GUERNSEY COUNTY

Population, 900.

Person making report, W. W. Dowdell, health officer.

1. None.
2. No.
3. Have not.
4. There was not.
5. None.
6. All.

Cases of infectious diseases reported:
Scarlet fever, 5; typhoid fever, 2. Total number of infectious diseases, 7.

QUINCY, LOGAN COUNTY.

Population, 800.

Person making report, S. W. Simons, M. D., health officer.

1. There has been considerable improvement in the way of cleaning up, such as vaults, garbage, etc.

2. Nothing has been done in regard to milk, but garbage is collected and disposed of.

3. Have had some little trouble to get the people to keep their privy vaults in sanitary condition.

4. No unusual prevalence of any particular disease in the last twelve months.

5. There has been no cerebro-spinal meningitis in our village for years.

6. Ninety-five per cent. of our village depends on wells for water, but the great majority of the wells are drilled wells and from fifty to one hundred and fifty feet deep.

We have had but three deaths in our village in the last year.

RACINE, MEIGS COUNTY.

Population, 500.

Person making report, John Philson, health officer.

1. The health of the town has been remarkably good during the past year.

3. No difficulties have been en-

countered in the enforcement of the health laws.

4. There has not been a single case of contagious disease during the past year.

6. A very small portion of the population depends upon wells for water supply.

RAVENNA, PORTAGE COUNTY.

Population, 4,500.

Person making report, F. A. Chamberlin, health officer.

Cases of infectious diseases reported:
Diphtheria, 1; whooping cough, 1. Total number of infectious diseases 2.

READING, HAMILTON COUNTY.

Person making report, George Siebel, health officer.

The laws have been well obeyed and the sanitary conditions are first-class.

Cases of infectious diseases reported:
Diphtheria, 2; scarlet fever, 1; typhoid fever, 4; other infectious diseases, 10. Total number of infectious diseases, 17.

REYNOLDSBURG, FRANKLIN COUNTY.

Population, 400.

Person making report, B. F. Orem, health officer.

1. Sanitary conditions are good.

2. No regulation for milk has been enforced, as but very little milk is sold by peddlers here.

4. No unusual prevalence of any disease.

6. Wells are in general use for water supply; no waterworks of any kind.

The general health of the village for the last year was exceptionally good.

RICHMOND, JEFFERSON COUNTY.

Population, 450.

Person making report, Dr. S. Rothacker, health officer.

1. No improvements during year.
2. Not any.
3. One instance, objected to being quarantined. It was done all the same, and no further trouble.
4. Yes, scarlet fever, 28 cases, all recovered nicely. This trouble started in so mild a form that many children were infected before a physician was called to see what the trouble was. It is about a month since the last case occurred.

5. We have not had any cerebrospinal meningitis.

6. No other source of water but wells.

Cases of infectious diseases reported: Scarlet fever, 28.

RICHMOND, LAKE COUNTY.

Population, 300.

Person making report, H. S. Barton, health officer.

1. No particular improvements.
2. Milk supply is local, people in neighborhood keeping cows furnish supply.

Garbage is promptly removed when necessary.

3. No difficulties.
4. None whatever.
5. None.
6. Water supply from Lake Erie, Painesville waterworks department.

RICHWOOD, UNION COUNTY.

Population, 2,000.

Person making report, R. G. Cook, clerk of board of health.

Cases of infectious diseases reported: Diphtheria, 2; typhoid fever, 3; whooping cough, 10; measles, 75; other in-

fectious diseases, 1. Total number of infectious diseases, 91.

RIPLEY, BROWN COUNTY.

Population, 3,000.

Person making report, Geo. P. Tyler, M. D., health officer.

The water supply of Ripley is good; sanitary conditions better than in years past; physicians report all contagious and infectious diseases; perfect quarantine when required; no burial without a permit.

Cases of infectious diseases reported: Smallpox, 2; diphtheria, 10; typhoid fever, 10. Total number of infectious diseases, 22.

RISINGSUN, WOOD COUNTY.

Population, 700.

Person making report, M. C. Mowen, health officer.

3. Yes, in not having a suitable place to dump garbage.

6. All.

Cases of infectious diseases reported: Membranous croup, 2; typhoid fever, 12; whooping cough, 3; measles, 2. Total number of infectious diseases, 19.

ROCHESTER, LORAIN COUNTY.

Population, 300.

Person making report, Jno. T. Henderson, M. D., health officer.

1. None to my knowledge.

2. No.

3. Apparently there are no local rules, and council will listen to no suggestions that involve the least expenditure.

4. Whooping cough throughout the summer.

5. None.

6. The whole population depends upon wells or cisterns.

Cases of infectious diseases reported:
Smallpox, 1; membranous croup, 1;
typhoid fever, 3; whooping cough, 40.
Total number of infectious diseases, 45.

ROCK CREEK, ASHTABULA
COUNTY.

Population, 550.

Person making report, B. C. Carpenter, health officer.

1. The draining of a large plat of low land.
2. In milk, none; in garbage, by collecting the same.
3. Yes, by causing manure and privies to be removed and cleaned.
4. None.
5. None.
6. The whole village.

ROCKFORD, MERCER COUNTY.

Population, 1,400.

Person making report, S. J. Robinson, secretary of board of health.

Cases of infectious diseases reported:
Scarlet fever, 1.

ROCKPORT, CUYAHOGA COUNTY.

Population, 2,600.

Person making report, Chas. L. Wood, M. D., health officer.

1. Water has been introduced to the main streets in hamlet during past year, supply being taken from Cleveland.
2. No new regulations regarding milk supply or collection of garbage.
3. Regarding enforcement of health regulations, there has been no trouble.
4. No unusual prevalence of any particular disease during year, on contrary, has been remarkably healthy.
5. There have been no deaths from cerebro-spinal meningitis.

6. Roughly estimating, 90 per cent. of the population still depend on wells for water supply.

Cases of infectious diseases reported:
Diphtheria, 4.

ROCKY RIVER, CUYAHOGA COUNTY

Population, 1,000 to 1,500.

Person making report, Alfred W. Andersen, M. D., health officer.

1. Many improvements as to sewer and water contemplated.

4. No unusual epidemic of diseases here.

6. We depend upon wells exclusively for water.

Cases of infectious diseases reported:
Typhoid fever, 6; whooping cough, 7; measles, 2; other infectious diseases, 1.
Total number of infectious diseases, 16.

ROME, ADAMS COUNTY.

Population, 220.

Person making report, R. Y. Littleton, M. D., health officer.

Cases of infectious diseases reported:
Diphtheria, 5.

ROSEVILLE, MUSKINGUM
COUNTY.

Population, 1,550.

Person making report, T. C. Hilliard, health officer.

1. Brick privy vaults have taken the place of old wooden ones and the hog pen ordinance has reduced the amount of hog pens.

2. Have not had any trouble in enforcing ordinances.

4. None.

5. None.

6. All of the village uses well water.

Cases of infectious diseases reported:
Measles, 2.

RUSHVILLE, FAIRFIELD COUNTY.

Population, 300.

Person making report, Dr. W. C. Lewis, health officer.

1. Our village has excellent drainage; garbage of all kinds is burned. Trash of various kinds instead of being thrown into alleys and back lots is now hauled away and either burned or buried.

2. Milk supply is good, obtained from persons who keep cows for the purpose. They are well kept and are cleanly stabled in winter.

3. Not of late. Formerly had trouble; people generally are willing to do the right thing, if they are approached in a kindly manner and proper explanations made.

Generally find trouble if you are hunting right hard for it. This, at least, has been my experience.

4. No.

5. None.

6. One hundred per cent. of our water supply is from wells. They are kept clean and the water is excellent.

We have a nice, clean, healthy village. Whooping cough excepted, we have had no infectious diseases.

Cases of infectious diseases reported: Whooping cough, 3.

SABINA, CLINTON COUNTY.

Population, 1,800.

Person making report, S. B. Lightner, health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. Fifty per cent.

Cases of infectious diseases reported: Typhoid fever, 1.

ST. BERNARD, HAMILTON COUNTY.

Population, 3,900.

Person making report, J. W. Thiel, M. D., health officer.

1. The sanitary sewer is about completed in this village.

2. Outside of personal inspection of dairies and cows, nothing has been done regarding milk supply. Garbage is being collected.

3. Two cases. One was a case of a dirty dairy. The other failure to abate nuisance. In both cases offender was arrested and fined.

4. No.

5. No deaths; one case reported; recovered.

6. None. We have our own water-works and fully 90 per cent. of our people use water of our plant. The other 10 per cent depend upon rain water stored in cisterns.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 9; membranous croup, 1; scarlet fever, 5; typhoid fever, 3; whooping cough, 5; measles, 10; other infectious diseases, 1. Total number of infectious diseases, 35.

ST. LOUISVILLE, LICKING COUNTY.

Population, 350.

Person making report, Lera L. Marriott, health officer.

Cases of infectious diseases reported: Measles, 2; other infectious diseases, 3. Total number of infectious diseases, 5.

ST. MARYS, AUGLAIZE COUNTY.

Population, 6,500.

Person making report, I. E. Williams, health officer.

Cases of infectious diseases reported: Diphtheria, 3; scarlet fever, 5; typhoid fever, 6. Total number of infectious diseases, 14.

ST. PARIS, CHAMPAIGN COUNTY.

Population, 1,400.

Person making report, C. A. Offenbacher, health officer.

1. None in particular; our village is in fair sanitary condition.

2. Have a new dump ground for garbage outside the corporate limits and are just now making arrangements for garbage removal.

3. The worst is the regulation of privy vaults; have to watch every improvement.

4. No.

5. None.

6. One hundred per cent.

The unusual death rate this year was due to the number of old persons dying, seven being over 80 years and five between 60 and 80.

Average of all deaths, 53 years.

Cases of infectious diseases reported: Typhoid fever, 3; whooping cough, 40; other infectious diseases, 30. Total number of infectious diseases, 73.

SALEM, COLUMBIANA COUNTY.

Population, 8,000.

Person making report, E. J. Schwartz, health officer.

1. None, except our regular routine work.

2. Have established a system of garbage collection with an efficient man in charge.

3. Have had no trouble enforcing any of the laws except the pure food law regarding the use of preservative in sausage.

4. In August and September quite a number of typhoid cases and from September on diphtheria has been very prevalent with us.

5. Have had no deaths from cerebro-spinal meningitis.

6. There is probably about one well to every 150 people.

We had 90 deaths, making about 11.25 per cent, according to our estimated population.

Cases of infectious diseases reported: Diphtheria, 17; membranous croup, 1; scarlet fever, 1; typhoid fever, 27; measles, 5. Total number of infectious diseases, 51.

SALESVILLE, GUERNSEY COUNTY.

Population, 228.

Person making report, W. T. Carpenter, health officer.

So far we have had no trouble in enforcing the health laws. There have been no changes in our corporation laws lately. The general health of our people is good.

SALINEVILLE, COLUMBIANA COUNTY.

Population, 2,800.

Person making report, H. M. Calvin, M. D., health officer.

1. No improvements.

2. No.

3. I have had all kinds of trouble trying to prevent butchering in the village; also in making people dig new vaults to closets, and clean up and make them keep clean.

4. No.

5. No.

6. A very small per cent. use well water. The water that supplies the town is pumped from the creek. Cows are pastured in a field through which the creek flows and stand in the creek above the place from which the water is pumped.

Cases of infectious diseases reported: Diphtheria, 6; typhoid fever, 4. Total number of infectious diseases, 10.

SANDUSKY, ERIE COUNTY.

Person making report, W. H. Busch, M. D., health officer.

1. No improvements have been made in the sanitary condition of our city.

2. No new regulations have been enforced as regards the milk supply and collection of garbage.

3. I have not encountered any difficulties in enforcing the health laws.

4. There was not an unusual prevalence of any particular disease.

5. There were three deaths from cerebro-spinal meningitis.

Cases of infectious diseases reported: Diphtheria, 28; membranous croup, 1; scarlet fever, 15; typhoid fever, 21; measles, 3; chickenpox, 4. Total number of infectious diseases 72.

SAVANNAH, ASHLAND COUNTY.

Population, 300.

Person making report, T. H. Stinebring, health officer.

One-half the population depends upon wells for water supply.

Cases of infectious diseases reported: Typhoid fever, 3; whooping cough, 12. Total number of infectious diseases, 15.

SEBRING, MAHONING COUNTY.

Population, 2,000.

Person making report, Frank Chisler, health officer.

1. Some grading and filling in of low places in which water had stood most of the year.

2. No.

3. No.

4. More typhoid than any other year; fall and winter.

5. No.

6. None.

Cases of infectious diseases reported: Scarlet fever, 15; typhoid fever, 9; whooping cough, 20; measles, 10; other infectious diseases, 68. Total number of infectious diseases, 122.

SENECAVILLE, GUERNSEY COUNTY.

Population, 800.

Person making report, Richard Loury, health officer.

Cases of infectious diseases reported: Scarlet fever, 2.

SEVEN MILE, BUTLER COUNTY.

Population, 400.

Person making report, C. B. Wilson, health officer.

1. The general health of this community is good, and, in fact, excellent, as two of the deaths that occurred during the last year were of people who moved here for their betterment.

6. The village depends on wells for water, but our water cannot be bettered, with the exception of a few open wells, and they will be done away with as speedily as possible.

SHANESVILLE, TUSCARAWAS COUNTY.

Population, 500.

Person making report, A. T. Miller, health officer.

1. Have abated one nuisance.

2. No.

3. No.

4. Yes; diphtheria during months of November and December in mild form, and was impossible to quarantine all cases on account of mildness, as they did not call in a doctor for examination.

5. No.

6. All depend on wells. Otherwise our town is in fairly good sanitary condition.

Cases of infectious diseases reported: Diphtheria, 10; membranous croup, 1; typhoid fever, 5; measles, 5. Total number of infectious diseases, 21.

SHAWNEE, PERRY COUNTY.

Population, 3,000.

Person making report, Emerson Peart, health officer.

1. None.
2. No.
3. No.
4. No.
5. No.
6. Two-thirds.

Cases of infectious diseases reported: Diphtheria, 2; typhoid fever, 14. Total number of infectious disease, 16.

SHELBY, RICHLAND COUNTY.

Population, 6,000.

Person making report, R. E. Smucker, health officer.

1. No improvements have been made in sanitary condition.
2. No new regulations.
3. Not much difficulty in enforcing health laws.
4. No unusual prevalence of any one disease.
5. Cerebro-spinal meningitis, five deaths.
6. About one hundred per cent. depend upon wells for water supply.

Cases of infectious diseases reported: Membranous croup, 7; typhoid fever, 6; whooping cough, 9. Total number of infectious diseases, 22.

SHERODSVILLE, CARROLL COUNTY.

Population, 925.

Person making report, John Ehden, mayor.

Cases of infectious diseases reported: Diphtheria, 2.

SHREVE, WAYNE COUNTY.

Population, 1,130.

Person making report, J. R. Butler, health officer.

1. There have been no improvements made in regard to the sanitary condition of the village.
 2. No new regulations have been enforced in regard to the milk supply or collection of garbage.
 3. Have had no difficulties in enforcing the health laws.
 4. No unusual prevalence of any particular disease during the year.
 5. No cases or deaths from cerebro-spinal meningitis during the year.
 6. About 5 per cent of the population depend upon wells for a domestic supply of water.
-

SIDNEY, SHELBY COUNTY.

Population, 6,000.

Persons making report, Dr. F. D. Anderson and Wm. C. Wyman, health officers.

1. We have paved streets and good sewers.
2. Dr. J. W. Costolo examines the milk, the health officer examines dairies, cans, wagons and water for cows. Cows all found in good condition. All milk up to the standard. All garbage is taken from the streets every day by the street commissioner.
3. I have no trouble in enforcing the orders of the board.
4. There was no unusual prevalence of any particular disease during the year.
5. There were no deaths from cerebro-spinal meningitis.
6. About 1,500 are depending on wells for water supply.

Cases of infectious diseases reported: Diphtheria, 7; scarlet fever, 10; whooping cough, 1; other infectious diseases, 1. Total number of infectious diseases, 19.

Note.—All school houses are in good sanitary condition. I issued 60 per-

mits to sell milk and fresh meat during the year, and 114 permits to clean vaults, after notice had been given. The people are making connection with the sewer slowly. While the deaths the last year were 99 against 95 in 1904, forty were between 70 and 90 years. Sidney has been free from all contagious and infectious diseases since September last. The expense of the board for 1905 were; for salary of health officer, \$256.00; sanitary officer, \$170.00; milk inspector, \$12.00; doctor attending diphtheria patient, \$9.00; food and fuel, \$5.00; all other supplies, including paint for pest house, livery hire, printing and disinfecting supplies, about \$200.00; total, \$1,840.

SILVERTON, HAMILTON COUNTY.

Population, 300.

Person making report, Dr. A. A. Sprague, health officer.

1. The village has made no sanitary improvements.
2. The dairies are well kept.
4. During the late spring and summer there was an epidemic of whooping cough, which was of a mild form.
6. The water supply is from wells.

SMITHVILLE, WAYNE COUNTY.

Population, 475.

Person making report, W. G. Zimmerman, health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 1. Total number of infectious diseases, 2.

SOMERSET, PERRY COUNTY.

Person making report, Michael Clouse, health officer.

1. None.
2. No.
3. No.

4. No.
5. None.
6. All.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 1; whooping cough, 1. Total number of infectious diseases, 3.

SOMERVILLE, BUTLER COUNTY.

Population, 370.

Person making report, Frank Chapin, health officer.

1. I had manure heaps moved every 30 days during seven months.
2. None only as I had garbage moved by notifying the persons myself.
3. Yes; principally privy vaults and hog pens.
4. None.
5. None.
6. The entire village depends on wells.

SOUTH POINT, LAWRENCE COUNTY.

Population, 300.

Person making report, C. Wayne McCoy, health officer.

1. Ditches have been widened and deepened, giving better drainage.
2. No new regulations have been enforced regarding milk supply, collection of garbage, etc.
3. No difficulty in enforcing laws and regulations except in securing reports of infectious diseases, births and deaths from physicians in attendance.
4. No unusual prevalence of any disease during year.
5. No cases of cerebro-spinal fever.
6. About 10 per cent. depend upon wells for domestic water supply.

SPENCERVILLE, ALLEN COUNTY.

Population, 2,600.

Person making report, G. A. Rusler, health officer.

1. Pretty well cleaned up, and some ditching and tiling put in, and more needed.

2. Yes; in getting manure and garbage out of our alleys; milk, none.

3. Have had no difficulty in enforcing the law; no prosecutions.

4. Yes; smallpox in the spring, 11 cases, and no deaths.

5. Yes, 3.

6. All.

Cases of infectious diseases reported: Smallpox, 11; diphtheria, 6; typhoid fever, 5. Total number of infectious diseases, 22.

Note.—The board of health meets the first Monday night of each month. The health officer was paid \$25.00 and the sanitary policeman \$25.00; \$40.00 was spent for smallpox cases and \$15.00 for diphtheria cases, making a total of \$105.00. Our school house is examined twice a year. When a contagious disease occurs among the pupils we have them taken out of school and the school house thoroughly fumigated once a week until the disease is stamped out.

SPRINGBORO, WARREN COUNTY.

Population, 500.

Person making report, John W. Bloss, health officer.

1. We have not made any improvements. Our village is in a very good sanitary condition.

2. We have no new regulations in regard to milk supply. Our milk supply is good. The garbage is all kept cleaned up. We have a place especially for that purpose, and we keep our village in sanitary condition.

3. I have had no difficulty in enforcing the law. I had some difficulty with undertakers in regard to permits in transferring bodies here. They claim the transfer permit is all that is necessary and neglect getting a burial permit from me.

4. There was no disease in our village this season.

5. There were no cases of cerebro-spinal meningitis.

6. Our water supply is altogether from wells. We have a fine water supply, mostly drove wells.

Note.—Our town is in a healthy condition, and we aim to keep it in that condition.

SPRINGFIELD, CLARK COUNTY.

Population, 45,000.

Person making report, John M. Buckingham, health officer.

Cases of infectious diseases reported: Smallpox, 5; diphtheria, 18; scarlet fever, 76; typhoid fever, 68; measles, 8. Total number of infectious diseases, 175.

SPRING VALLEY, GREENE COUNTY.

Population, 600.

Person making report, S. E. Dyke, M. D., health officer.

1. There has been no improvement of a sanitary nature during the past year.

2. There has been no change as regards milk supply. The garbage is cleaned up and removed by wagon outside the corporate limit, by permission, and disposed of.

3. Have had no trouble in enforcing the health laws.

4. There has been no unusual prevalence of diseases during the past season.

5. There has been no case of cerebro-spinal meningitis.

6. About all.

Cases of infectious diseases reported: Diphtheria, 1; typhoid fever, 1; chicken pox, 4. Total number of infectious diseases, 6.

STEUBENVILLE, JEFFERSON COUNTY.

Population, 22,000.

Person making report, Wm. S. McCauslen, clerk.

Cases of infectious diseases reported:
Scarlet fever, 54; measles, 44. Total
number of infectious diseases, 98.

STOCKPORT, MORGAN COUNTY.

Population, 400.

Person making report, T. J. Lyne,
health officer.

Cases of infectious diseases reported:
Typhoid fever, 4; whooping cough, 20.
Total number of infectious diseases,
24.

STRASBURG, TUSCARAWAS COUNTY.

Population, 1,000.

Person making report, J. C. Schutz-
bach, health officer.

Cases of infectious diseases reported:
Scarlet fever, 4; typhoid fever, 2. To-
tal number of infectious diseases, 6.

STRUTHERS, MAHONING COUNTY.

Population, 2,800.

Person making report, Arthur L.
Jones, health officer.

Note.—I was appointed in May, 1905,
and I found the sanitary conditions in
only fair state. The village has only
been incorporated three years, and it
is a hard matter to get the people to
comply with the state law in regard to
vaults, etc. I am going to try and
have an ordinance passed concurring
with the state law. The Mahoning
Valley Water Co. is building a dam in
Yellow Creek about a mile from our
village that will hold about 8,000,000
gallons of water, that will give us a
pressure of about 90 pounds, and we
will no doubt have sewers in our prin-
cipal streets, which will help our
health conditions.

STRYKER, WILLIAMS COUNTY.

Population, 1,450.

Person making report, J. E. Meek,
health officer.

1. Sanitary condition of village is
good.

2. Yes.

3. No.

4. No.

5. None.

6. Water supply of entire village
is from drove wells.

Cases of infectious diseases reported:
Typhoid fever, 5; whooping cough, 10.
Total number of infectious diseases,
15.

SUGAR CREEK, TUSCARAWAS COUNTY.

Population, 400.

Person making report, E. E. Weaver,
clerk.

Cases of infectious diseases reported:
Scarlet fever, 2; typhoid fever, 11. To-
tal number of infectious diseases, 13.

SUGAR GROVE, FAIRFIELD COUNTY.

Population, 400.

Person making report, S. Renshaw,
health officer.

1. No improvements.

2. No.

3. No.

4. None.

5. None.

6. All.

SYLVANIA, LUCAS COUNTY.

Population, 1,000.

Person making report, A. E. Stow,
health officer.

Cases of infectious diseases reported:
Diphtheria, 7.

TARLTON, PICKAWAY COUNTY.

Population, 350.

Person making report, W. A. Leish, health officer.

1. No.
 2. No.
 3. No.
 4. None.
 5. None.
 6. All.
-

THORNVILLE, PERRY COUNTY.

Population, 450.

Person making report, Frank R. Clemson, M. D., health officer.

1. The sanitary condition of the village is very good.

2. No new regulations regarding milk supply or garbage.

3. No trouble in enforcing health regulations.

4. No particular disease prevalent.

5. No cerebro-spinal meningitis.

6. All depend on wells for water supply.

Cases of infectious diseases reported: Diphtheria, 1.

TIFFIN, SENECA COUNTY.

Population, 13,000.

Person making report, Dr. A. C. Schwartz, health officer.

1. None.
2. No.
3. No.
5. None.
6. About 4,000.

Cases of infectious diseases reported: Smallpox, 6; diphtheria, 45; scarlet fever, 7; typhoid fever, 23. Total number of infectious diseases, 81.

TIPPECANOE CITY, MIAMI
COUNTY.

Population, 2,100.

Person making report, F. N. Aggenbroad, health officer.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 6; typhoid fever, 1; whooping cough, 3. Total number of infectious diseases, 11.

Note.—If the state board of health would recommend a bill to the legislature granting a compensation to members of boards of health of villages, it would be the greatest help to health officers in this state, as many health officers have much trouble in getting their boards together for the reason they receive nothing for their time, and become negligent. I would suggest that a bill be framed and presented to this house now in session, and I believe it would be passed, and if passed would be one of the greatest helps to health officers of anything yet.

TOLEDO, LUCAS COUNTY.

Population, 164,264.

Person making report, W. W. Brand, M. D., health officer.

Cases of infectious diseases reported: Smallpox, 97; diphtheria, 221; membranous croup, 16; scarlet fever, 58; typhoid fever, 277; whooping cough, 13; measles, 27; other infectious diseases, 176. Total number of infectious diseases, 885.

TORONTO, JEFFERSON COUNTY.

Population, 6,000.

Person making report, John Wellington, health officer.

1. Three main streets and several others.

2. None as yet.

3. Some difficulty.

4. None.

5. One death.

6. None.

Cases of infectious diseases reported: Diphtheria, 4; typhoid fever, 8; measles, 3. Total number of infectious diseases, 15.

TRENTON, BUTLER COUNTY.

Population, 500.

Person making report, Wilson Thompson, health officer.

Cases of infectious diseases reported:
Scarlet fever, 1.

TRIMBLE, ATHENS COUNTY.

Population, 700.

Person making report, A. W. Dean, health officer.

1. All premises and vaults have been pretty thoroughly cleaned.

2. Garbage has been taken to a dump ground and all putrid substances buried.

3. By some of the citizens refusing to clean up premises after being notified by health officer to do so. Street commissioner has not complied with notice to clean streets and alleys and open up drains as ordered by health officer.

4. During the fall and winter of 1905 there were 15 cases of typhoid fever and the disease is still present.

5. None.

6. About 90 per cent. depend on wells for domestic water supply.

Cases of infectious diseases reported:
Typhoid fever, 15.

Note.—The council procured a dumping ground last spring and the health officer is custodian of said ground. Most of our privy vaults were cleaned and the contents taken to the dumping ground and buried. We have had no cases of contagious diseases in our village in 1905. The sanitary condition of our village is the best it has been for some time and we expect to make it far better next year. Number of deaths in 1905 total 13.

UHRICHSVILLE, TUSCARAWAS COUNTY.

Population, 5,000.

Person making report, Finley Johnston, health officer.

1. Conditions bettered by increased sewerage; better and cleaner streets. Still room for much improvement.

2. We have had one prosecution for adulteration of milk.

3. Our people respond fairly well to request of board.

4. Diphtheria has been more prevalent than any other disease. At this writing only one case under quarantine. The disease has not been confined to any particular part of the village.

5. None.

6. About, "I think, one-fifth of our population depend on wells.

Cases of infectious diseases reported:
Diphtheria, 18; scarlet fever, 1; typhoid fever, 1; whooping cough, 1; measles, 2. Total number of infectious diseases, 23.

UNION CITY, DARKE COUNTY.

Population, 1,500.

Person making report, Clinton Earnhart, health officer.

1. Two sewers were put in, draining several very unhealthy cellars.

2. No.

3. None whatever.

4. No.

5. None.

6. About two-thirds.

Cases of infectious diseases reported:
Diphtheria, 1; typhoid fever, 7. Total number of infectious diseases, 8.

UNIONVILLE CENTER, UNION COUNTY.

Person making report, Dr. C. O. McCune, health officer.

1. Three ditches tiled.

2. No.

3. No.

4. No.

5. None.

6. All.

Cases of infectious diseases reported:
Whooping cough, 12.

UNIOPOLIS, AUGLAIZE COUNTY.

Population, 500.

Person making report, J. W. Hurlburt, health officer.

1. A number of ditches have been cut with a view to surface drainage.

2. No.

3. Yes. Because of obstinacy or indifference on the part of council, I have been compelled to place a rather elastic construction on some of the health rules. The council failed to provide a dumping ground for the disposal of the foul accumulations of the village, although frequently requested to do so. They (the council) also failed to cause the removal of certain obstructions to the free flow of water along a stream flowing through town, said obstructions being along streets and alleys. They were often told that this was important and should be done.

4. An epidemic of jaundice among children prevailed here during the months of Sept. and Oct. Probably had forty cases. No fatalities.

5. Had no cases of meningitis.

6. Everybody here uses well water.

Note.—The remarkable indifference of the various councils of this village in regard to health conditions that affect and vitally concern the public is phenomenal, if not appalling. They in no wise seem inclined to co-operate with the health authorities; especially is this noticeable when there is a little, although unavoidable, expense.

UPPER SANDUSY, WYANDOT COUNTY.

Population, 3,900.

Person making report, Dr. G. O. Maskey, health officer.

1. The only improvements made in the sanitary condition of our village during the past year were the building of some paved streets and laying one sanitary sewer.

2. No new regulations have been enforced.

3. We have encountered no difficulties in enforcing the health laws, or orders of the health officer.

4. We have had quite a prevalence of measles and a mild form of scarlet fever.

6. Only a small per cent. of our people depend upon wells for their water supply.

Cases of infectious diseases reported: Scarlet fever, 22; measles, 40. Total number of infectious diseases, 62.

URBANA, CHAMPAIGN COUNTY.

Population, 7,500.

Person making report, H. M. Pearce, M. D., health officer.

1. None.

2. No.

3. No.

4. No.

5. None.

6. One-twentieth.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 1; typhoid fever, 3; measles, Dutch, 1. Total number of infectious diseases, 6.

UTICA, LICKING COUNTY.

Population, 2,000.

Person making report, A. W. Vance, health officer.

1. Clearing away garbage.

2. No.

4. No.

6. All use wells.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 10; typhoid fever, 1. Total number of infectious diseases, 12.

VANDALIA, MONTGOMERY COUNTY.

Population, 400.

Person making report, Dr. W. H. Riley, health officer.

1. None.
2. None.
3. None.
4. Measles early in the year, January and February.
5. None.
6. 100 per cent.

Cases of infectious diseases reported: Typhoid fever, 1; measles, 30. Total number of infectious diseases, 31.

Note.—The plan of having health officer only works admirably. Sanitary condition is good.

VAN WERT, VAN WERT COUNTY.

Population, 8,000.

Person making report, C. G. Church, health officer.

1. The board of health of Van Wert is now the board of service, and I know that the smaller number of men has been conducive to more harmonious work this year than in the past.

2. The board has endeavored to maintain a higher degree of cleanliness in all lines than ever before. Our hobby the past year was making a regular inspection of the slaughter houses and enforcing absolute cleanliness.

4. We had an epidemic of scarlet fever in the months of January, February and March, also quite a number of cases of typhoid fever during the summer and early autumn.

6. About 60 per cent. of the population of Van Wert depend on their own wells for their water supply. This information was furnished through the kindness of the superintendent of the waterworks.

Cases of infectious diseases reported: Smallpox, 3; diphtheria, 1; scarlet fever, 45. Total number of infectious diseases, 49.

VERMILION, ERIE COUNTY.

Population, 1,450.

Person making report, J. M. Delker, health officer.

Cases of infectious diseases reported: Scarlet fever, 4; typhoid fever, 1. Total number of infectious diseases, 5.

VERSAILLES, DARKE COUNTY.

Population, 1,500.

Person making report, C. F. Ryan, health officer.

1. Quite a lot of cement gutters have been put in.

2. No.

3. No.

4. No.

5. None.

6. About sixty-five per cent.

Cases of infectious diseases reported: Scarlet fever, 7.

VIENNA X ROADS, CLARK COUNTY.

Population, 325.

Person making report, E. A. Dye, M. D., health officer.

Cases of infectious diseases reported: Typhoid fever, 2.

WADSWORTH, MEDINA COUNTY.

Population, 2,500.

Person making report, M. C. Lytle, acting health officer and clerk of board of health.

Cases of infectious diseases reported: Typhoid fever, 4.

Note.—We have been unable to get a meeting of the board of health, owing to a lack of interest in the matter. I have tried to get such a meeting, but have not succeeded in getting a quorum together, hence have ceased trying, and have done what I could in the health line as acting health officer. Dr. C. N. Lyman died October 24, and thus passed away the old standby of the board of health, and one of the men who were instrumental in passing the first health laws of the state.

WALDO, MARION COUNTY.

Population, 259.

Person making report, Dr. B. D. Osborne, health officer.

Cases of infectious diseases reported: Measles, 16.

Note.—Our board should be reorganized; in fact have not met during 1905. Clerk and several members have left the town.

WAPAKONETA, AUGLAIZE COUNTY.

Population, 5,000.

Person making report, A. Kohler, health officer.

1. No.

2. No.

3. No.

4. No.

5. No.

6. About 50 per cent depend upon wells.

Cases of infectious diseases reported: Diphtheria 1; membranous croup, 1; scarlet fever, 5. Total number of infectious diseases, 7.

WARREN, TRUMBULL COUNTY.

Population, 12,000.

Person making report, Thos. B. Webb, sanitary poliueman.

1. Changing outlet for 1,280 feet of sewerage and storm water from above to below intake of waterworks, also building in addition to the above, 11,980 feet of sewers.

2. No new regulations, but more rigid inspections.

3. None.

4. No.

5. None.

6. About 5 per cent.

Cases of infectious diseases reported: Diphtheria, 6; scarlet fever, 7; typhoid fever, 11; whooping cough, 11; measles, 1; other infectious diseases

(chicken pox), 9. Total number of infectious diseases, 45.

Note.—For violations of sanitary code we had four arrests and convictions. The maintenance of the board, for salaries and all expenses, was \$1,389.93. There were 22 regular meetings of the board. We had 27 less deaths than the previous year, and one more birth; we had but two deaths from cholera infantum. The schools are frequently inspected, and when children get suspiciously sick at school the sanitary policeman is notified at once, and investigates, and if there is cause, he notifies the superintendent of schools by filling out a blank form, and the child is not permitted to return until well, and produces certificate to that effect.

WASHINGTON, GUERNSEY COUNTY.

Population, 400.

Person making report, S. B. Lawrence, health officer.

1. Sanitary condition of village unchanged.

2. We have no order regulating milk supply.

3. Not especially so.

4. No, sir.

5. None.

6. The entire population.

WAUSEON, FULTON COUNTY.

Population, 2,800.

Person making report, Frank Yarnell, health officer.

Cases of infectious diseases reported: Diphtheria, 4; membranous croup, 1; scarlet fever, 10; typhoid fever, 7. Total number of infectious diseases, 22.

WAVERLY, PIKE COUNTY.

Population, 1,896.

Person making report, James J. Emmitt, health officer.

1. No improvements of any consequence.

2. None.

3. Not any.

4. Yes; scarlet fever in the fall, 19 cases, started from a smuggled case. The family failed to call a physician, hence the spread.

5. None.

6. Very near all, that and cisterns.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 19; typhoid fever, 1. Total number of infectious diseases, 21.

Note.—The sanitary condition of our town could be better, but the lack of necessary funds prohibits an effort. For the last year or more the board failed to meet, then council took hold, and has acted upon matters connected with the board. The empty canal bed running through this place is an intolerable nuisance, and should be either improved or abandoned.

WAYNESBURG, STARK COUNTY.

Population, 700.

Person making report, Gustav A. Shane, health officer.

1. The water supply has been increased from an approved source by the erection of an adequate pumping station, the construction of a modern reservoir and the laying of conduits to all portions of the village. The supply is now adequate to a population of five thousand.

2. No changes in the matter of milk supply have been inaugurated.

3. Have not encountered much difficulty in enforcing needed health regulations.

4. There was no prevalence of any special diseases, save, perhaps, an influenza, evidently an echo of the grippe.

5. No deaths from any infectious or contagious diseases.

6. The freedom from infective intestinal disorders is manifestly due to the excellent quality of water furnished for all purposes, as about only one-half of one per cent. of the population receive their supply from wells or springs, about the quality of which there is a question.

Note.—During the year the board of health have adopted the rules suggested regarding the construction of cesspools, privy vaults and disposition of garbage by the State Board of Health, concerning which no conflicts have yet occurred.

WAYNESFIELD, AUGLAIZE COUNTY.

Population, 650.

Person making report, Jas. P. Benet, health officer.

1. There has been no special improvements; only try to keep clean of garbage.

4. We have been free from all contagious diseases.

5. We have not had any deaths from spinal troubles.

6. We all use well water.

Note.—The board has not met since last spring, but we have been watchful.

WAYNESVILLE, WARREN COUNTY.

Population, 800.

Person making report, Thos. Sherwood, health officer.

1. None.

2. No.

3. No.

4. During the summer we had an epidemic of whooping cough, in which the physicians were not often consulted, it being of a mild form, consequently no cases were reported to the health board.

5. No cases.

6. About 50 per cent.

WELLINGTON, LORAIN COUNTY.

Population, 2,200.

Person making report, E. T. Robinson, health officer.

3. I have had no trouble in enforcing health laws.

5. Have had no cases of cerebro-spinal meningitis.

6. Our water for domestic use is all from wells and cisterns, as the water from the waterworks is used only for sprinkling streets and fire protection, boilers in mills and factories, etc.

Cases of infectious diseases reported: Scarlet fever, 2; measles, 2. Total number of infectious diseases, 4.

Note.—Quite a number of our deaths were citizens of this place but who died away from home, and were brought home for burial. Our village has been unusually healthy. But we have quite a number of old residents, and more deaths between 70 and 90 years of age than any other period.

WELLSVILLE, COLUMBIANA COUNTY.

Population, 10,000.

Person making report, M. C. Tarr, M. D., health officer.

Cases of infectious diseases reported: Diphtheria, 7; membranous croup, 2; scarlet fever, 14; typhoid fever, 14; measles, 15. Total number of infectious diseases, 52.

WEST ALEXANDRIA, PREBLE COUNTY.

Population, 1,200.

Person making report, O. E. Bare, health officer.

1. I have brought before the council the fact that the law requires them to provide a place for night soil several different times, and so far they have taken no action, and it is impos-

sible to force owners to clean water closets and privies without a place for disposal of contents.

2. I have had an examination made of all milch cows by a veterinarian, and find them in healthy condition and stables in fair shape; no slop fed to cows.

3. There has been some difficulty in forcing people to abandon sinks, also the trouble mentioned above.

6. I should judge that about 40 per cent. of our people use wells for some part or all of their water supply, and the rest use city water altogether.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 1; measles, 11. Total number of infectious diseases, 13.

WEST CARROLLTON, MONTGOMERY COUNTY.

Population, 1,200.

Person making report, F. E. Hinkson, health officer.

Cases of infectious diseases reported: Scarlet fever, 1; typhoid fever, 1; whooping cough, 33. Total number of infectious diseases, 35.

WESTERN STAR, SUMMIT COUNTY.

Population, 150.

Person making report, F. Becker, health officer.

1. None.
2. None.
3. No.
4. No.
5. None.
6. All.

Cases of infectious diseases reported: Typhoid fever, 1; whooping cough, 10. Total number of infectious diseases, 11.

WEST FARMINGTON, TRUMBULL
COUNTY.

Population, 700.

Person making report, F. W. Ogram,
health officer.

Cases of infectious diseases reported:
Scarlet fever, 2; whooping cough, 2.
Total number of infectious diseases,
4.

WEST MANSFIELD, LOGAN
COUNTY.

Population, 1,200.

Person making report, H. A. Skid-
more, health officer.

1. None of importance.
2. No.
3. No.
4. No.
5. No.
6. Probably 75 per cent.

WEST MILTON, MIAMI COUNTY.

Population, 1,500.

Person making report, Gainor Jen-
nings, health officer.

1. Extension of sewers.
2. No.
3. No.
4. No.
5. No.
6. About 75 per cent.

Cases of infectious diseases reported:
Typhoid fever, 1.

WEST SALEM, WAYNE COUNTY.

Population, 700.

Person making report, J. W. Fer-
guson, health officer.

4. During the past year there has
been no unusual prevalence of any par-
ticular disease. There have been a
number of cases of whooping cough,
but not reported.

6. The whole population depend
upon wells and cisterns for their do-
mestic water supply.

Cases of infectious diseases reported:
Typhoid fever, 1.

WEST UNION, ADAMS COUNTY.

Population, 1,200.

Person making report, James W.
Bunn, health officer.

1. Such improvements as were ab-
solutely necessary.

3. None.

4. Diphtheria the latter part of
summer and first of winter.

5. One death.

6. Seventy-five per cent.

Cases of infectious diseases reported:
Diphtheria, 16; membranous croup, 1.
Total number of infectious diseases,
17.

WEST UNITY, WILLIAMS
COUNTY.

Population, 897.

Person making report, Joseph Fish-
er, health officer.

1. None.
2. No.
3. None.
4. No.
5. None.
6. All.

WHARTON, WYANDOT COUNTY.

Population, 600.

Person making report, J. J. Mayer,
health officer.

1. Built a new school building.
2. Not any.
3. Not any to speak of.
4. Measles in the months of Novem-
ber and December.
5. Not any.
6. One hundred per cent.

Cases of infectious diseases reported:
Scarlet fever, 1; typhoid fever, 2;
whooping cough, 6; measles, 73; other
infectious diseases (malarial fever).
12. Total number of infectious dis-
eases, 94.

WILLIAMSBURG, CLERMONT
COUNTY.

Population, 1,035.

Person making report, G. L. Hines,
M. D., health officer.

1. Nothing new in improvements.
2. Milk supply fine. Garbage required to be buried or hauled away from the village.
3. Have had but little trouble.
4. No.
5. None.
6. Ninety-five per cent, balance cisterns. Water supply very good.

WILLOUGHBY, LAKE COUNTY.

Population, 2,000.

Person making report, C. C. Jenkins, clerk board of health.

Cases of infectious diseases reported: Diphtheria, 1; scarlet fever, 2; typhoid fever, 6; measles, 1. Total number of infectious disease, 10.

WILLSHIRE, VAN WERT COUNTY.

Population, 850

Person making report, C. W. Bobo, health officer.

Cases of infectious diseases reported: Typhoid fever, 8.

WINCHESTER, ADAMS COUNTY.

Population, 1,000.

Person making report, C. S. Corboy, health officer.

Cases of infectious diseases reported: Diphtheria, 10; scarlet fever, 3; typhoid fever, 6; whooping cough, 1. Total number of infectious diseases, 20.

WINDHAM, PORTAGE COUNTY.

Population, 350.

Person making report, H. J. Higley, health officer.

1. Lowering and extending sewer in Main Street.

2. Not any.
3. No trouble at all.
4. Very healthy; only ten deaths last year.
5. None.
6. All depend on wells, mostly drilled wells.

Note.—We are 972 feet above sea level. The board recommends lowering and extending sewer in E. Center Street.

WOODSFIELD, MONROE COUNTY.

Population, 2,800.

Person making report, John Beard, health officer.

1. The town has placed quite a lot of new sewers in the past year.
2. No regulation in regard to milk supply. Garbage is carted out and burned.
3. No particular trouble in enforcing health laws.
4. No unusual prevalence of any particular disease.
5. None.
6. The entire population depend on wells for domestic water supply. The water furnished by water company has been muddy and foul for the past three or four months. There were four or five oil wells drilled on the hills above the water dam. The sand bailings and drillings of those oil wells were evidently washed into the water dam, so we have had very bad water.

Cases of infectious diseases reported: Scarlet fever, 10.

WOODSTOCK, CHAMPAIGN
COUNTY.

Population, 400.

Person making report, D. P. Smith, health officer.

1. None.
2. No.
3. No.
4. None.
5. One.

6. Seventy per cent.

Cases of infectious diseases reported:
Typhoid fever, 1.

WOODVILLE, SANDUSKY COUNTY.

Population, 1,000.

Person making report, Dr. R. M. Durbin, health officer.

1. The sanitary condition of our village has been improved by paving, and more thoroughly sewerage its principal street, about one mile in length, and by removing all night-soil twice yearly.

2. There has been no difficulty in enforcing the board's orders for the removal of garbage. The village has been unusually healthy during the year.

4. There has been no infectious disease of an epidemic character.

6. The population depends entirely upon wells for water supply. All are drilled to the limestone rock and cased with but few exceptions.

WREN, VAN WERT COUNTY.

Population, 275.

Person making report, P. G. Havice, health officer.

Cases of infectious diseases reported:
Typhoid fever, 1; whooping cough, 20; measles, 10. Total number of infectious diseases, 31.

WYOMING, HAMILTON COUNTY.

Population, 1,800.

Person making report, Geo. Stoddard, health officer.

Cases of infectious diseases reported:
Scarlet fever, 6.

Note.—Nothing new; conditions remaining about the same as in former reports. While we show a larger death rate than commonly, nine were per-

sons from 68 to 89 years of age and six children under three years. We have have no deaths from zymotic diseases in the past year, and only infectious disease was six light cases of scarlet fever (three in one family), the sanitary conditions surrounding all of which were of the best. The general health of the village has been excellent.

XENIA, GREENE COUNTY.

Population, 10,000.

Person making report, L. H. Brundage, health officer.

Cases of infectious diseases reported:
Diphtheria, 7; scarlet fever, 1. Total number of infectious diseases, 8.

YELLOW SPRINGS, GREENE COUNTY.

Population, 1,400.

Person making report, O. E. Carr, secretary board of health.

1. But few improvements have been made in the sanitary condition of the town.

2. Nothing has been done in regard to the milk supply. The council are going to provide a garbage dump.

3. No special difficulty in enforcing laws.

4. No unusual prevalence of any particular disease.

5. One case of meningitis.

6. I should judge that three-fourths of the town depend on wells, perhaps more.

Cases of infectious diseases reported:
Diphtheria, 1; typhoid fever, 1; measles, 4. Total number of infectious diseases, 6.

Note.—We have some trouble from water closets. The drainage is through the business part of the town, and there are a number of closets on this drain. Aside from this, we have had no trouble.

YORKSHIRE, DARKE COUNTY.

Population, 150.

Person making report, Alva Finkbone, health officer.

Cases of infectious diseases reported: Typhoid fever, 1.

Note.—Everything seems to be in a healthy condition. I have ordered privy vaults cleaned, and our town is in a healthy condition.

YOUNGSTOWN, MAHONING COUNTY.

Population, 60,000.

Person making report, H. E. Welch, M. D., health officer.

1. Large increase in sewers.
2. No.
3. No.
4. Diphtheria, August, September and October.
5. No.
6. Seventy-five per cent.

Cases of infectious diseases reported: Smallpox, 3; diphtheria, 207; scarlet fever, 128; typhoid fever, 124; whooping cough, 149; measles, 228; other infectious diseases (tuberculosis), 76. Total number of infectious diseases, 915.

ZANESFIELD, LOGAN COUNTY.

Population, 300.

Person making report, Dr. O. H. McDonald, health officer.

4. An unusual prevalence of typhoid during summer.

6. Entire population.

Cases of infectious diseases reported: Typhoid fever, 12.

ZANESVILLE, MUSKINGUM COUNTY.

Population, 25,000.

Person making report, G. Warburton, secretary board of health.

Cases of infectious diseases reported: Smallpox, 1; diphtheria, 40; membranous croup, 9; scarlet fever, 9; typhoid fever, 118; measles, 1. Total number of infectious diseases, 178.

ZOAR, TUSCARAWAS COUNTY.

Population, 196.

Person making report, Frank Ackerman, health officer.

1. None.
2. None.
3. None.
4. None.
5. None.
6. About two-thirds.

ANNUAL REPORT OF TOWNSHIP BOARDS OF HEALTH.

There are 1,352 township boards of health in the State: That is, the law provides that the three trustees of the township shall constitute a board of health for the township, such board to have all the powers and duties of boards of health of cities and villages. In a considerable number of townships the trustees have taken no action as a board of health.

The following list of questions was sent to the clerk of each township board of health:

1. Has your board of health appointed a health officer, as required by Section 2117? If so, give his name and address.

2. How much is paid the health officer annually?

3. How many meetings has the board held during the year?

4. Give number and character of nuisances abated by the board.

5. Is there any stream in your township which is a nuisance on account of pollution by sewage or other waste matter? If so, give location.

6. How many cases of the following diseases were reported to your board: Smallpox, diphtheria and membranous croup, scarlet fever, whooping cough, measles, typhoid fever?

7. Have attending physicians failed to report contagious diseases?

8. Has the board brought any prosecutions during the year?

9. If so, for what cause and with what result?

10. Were there any schools closed during the year on account of a contagious disease? If so, what was the disease?

11. What is the sanitary condition of schoolhouses in the township?

12. What amount of money was spent exclusively for board of health purposes?

13. What suggestions have you to offer for increasing the efficiency of township boards of health?

14. Give name of any officer or member of the board who can be communicated with by telephone.

Reports were received from 1,081, or 79.2 per cent. of the entire number.

Only a summary of these reports can be published, but this will fairly indicate the amount of sanitary work being done in the rural districts.

TOWNSHIP HEALTH OFFICERS.

Eight hundred and sixty-seven of the 1,081 boards reporting have appointed a health officer.

HEALTH OFFICER'S SALARY.

Many of the health officers receive no compensation, while others receive anywhere from \$5 to \$150 per year. A number are paid for services rendered.

MEETINGS OF THE BOARDS.

Seven hundred and thirty-eight of the boards reporting held meetings during the year.

NUISANCES ABATED.

Five hundred and fifty-two nuisances were reported abated by 146 different boards of health. Twenty-two townships reported streams polluted.

CONTAGIOUS DISEASES REPORTED.

The contagious and infectious diseases reported were as follows: Smallpox, 471 cases in 80 townships; diphtheria, 837 cases in 256 townships; scarlet fever, 1,218 cases in 296 townships; typhoid fever, 1,008 cases in 246 townships; whooping cough, 1,136 cases in 91 townships, and measles, 732 cases in 77 townships.

PHYSICIANS' REPORTS OF CONTAGIOUS DISEASES.

In 169 townships physicians failed to report cases of contagious diseases.

PROSECUTIONS.

Ten boards brought prosecutions during the year.

SCHOOLS CLOSED ON ACCOUNT OF CONTAGIOUS DISEASES.

One hundred and sixty-nine townships reported 189 schools closed on account of a contagious disease. Seventy were closed on account of scarlet fever, 72 on account of diphtheria; 30 on account of smallpox; 6 on account of measles; 2 on account of mumps, and one each on account of whooping cough, typhoid fever, chicken-pox and itch.

SANITARY CONDITION OF SCHOOLHOUSES.

Nine hundred and thirty-five townships reported upon the sanitary condition of their schoolhouses. In 724 the schoolhouses were in good

condition; in 184 townships they were fair, and in 27 townships they were not in good sanitary condition.

MONEY SPENT FOR BOARD OF HEALTH PURPOSES.

Only 589 township boards of health reported an expenditure of money for sanitary purposes. The amount spent was \$29,984.65, an average of about \$50.91 for each township. The largest amount spent in any one township was \$550. Most of this sum was spent in combating smallpox. The least amount spent was forty cents.

On the whole it must be admitted that sanitary matters in rural districts are not receiving such attention as they deserve.

ABSTRACTS OF REPORTS
OF
DEATHS AND THEIR CAUSES
DURING 1905.

[illegible]

*By Health Officers.

[illegible]

•By Health Officers.

Lancaster	15,000	1915	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	122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By Health Officers.

ABSTRACT OF THE REPORTS OF DEATHS

Cities.	*Estimated population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septic Infections.
Akron	50,000	557	11.14	.....	.....	14	1	.....	.....	.....	7	4	.....	.....	8
Alliance	12,000	106	8.83	.....	.....	4	.....	.....	.....	.....	.....	1	1	.....	.....
Ashtabula	15,000	204	13.60	32	20	9	.....	.....	1	.....	.....	.....	1	.....	2
Bellaire	12,000	179	14.92	47	15	2	.....	.....	.....	.....	1	2	1	1	2
Bellefontaine	7,611	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bowling Green	6,000	44	7.33	2	3	5	.....	.....	.....	.....	.....	.....	.....	.....	2
Bucyrus	8,000	63	7.87	1	2	2	.....	.....	.....	.....	.....	2	.....	.....	.....
Cambridge	11,500	107	9.30	14	4	4	.....	.....	.....	.....	.....	.....	1	.....	.....
Canal Dover	6,203	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Canton	40,000	417	14.25	88	29	4	.....	.....	.....	.....	1	12	8	1	7
Chillicothe	17,000	180	10.59	16	11	7	.....	.....	.....	.....	2	2	.....	1	7
Cincinnati	420,000	5,272	12.55	97	115	155	2	2	5	.....	44	87	56	21	15
Circleville	7,165	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland	440,000	6,424	14.60	1,646	512	67	.....	.....	.....	.....	24	109	33	16	40
Columbus	180,000	1,899	10.55	275	106	109	1	2	8	47	13	33	14	1	13
Conneaut	8,000	95	11.87	13	8	2	.....	1	.....	.....	2	.....	.....	.....	4
Coshocton	7,593	97	12.77	16	3	3	.....	.....	.....	.....	.....	2	1	1	1
Dayton	95,132	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Defiance	9,000	98	10.90	11	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware	12,000	104	8.67	2	3	3	.....	.....	.....	.....	3	1	.....	1	.....
East Liverpool	20,000	308	15.40	13	24	12	.....	.....	.....	.....	.....	8	.....	.....	3
Elyria	12,000	111	9.25	10	11	2	.....	.....	.....	.....	1	1	1	2	1
Findlay	20,000	224	11.20	16	9	7	.....	.....	.....	.....	1	4	.....	3	3
Fostoria	9,000	101	11.22	8	5	.....	.....	.....	.....	.....	.....	1	.....	2	.....
Fremont	10,000	119	11.90	3	10	4	.....	.....	.....	.....	.....	.....	1	.....	2
Galion	9,500	101	10.61	19	3	2	.....	.....	.....	.....	3	.....	1	.....	1
Gallipolis	5,600	130	23.21	7	7	2	.....	.....	.....	.....	.....	2	.....	.....	1
Greenville	7,000	62	8.86	3	.....	.....	.....	3	.....	.....	.....	.....	4	.....	.....
Hamilton	30,000	336	11.20	.....	.....	5	.....	.....	.....	.....	5	6	.....	1	9
Ironton	12,080	105	16.97	31	24	6	1	.....	.....	.....	3	5	.....	4	.....
Kenton	6,852	119	17.36	11	8	10	7	.....	.....	.....	6	5	.....	.....	.....
Lancaster	15,000	147	9.80	12	10	6	1	.....	.....	.....	.....	4	6	.....	.....
Lima	25,000	326	13.04	44	15	5	.....	.....	.....	.....	.....	12	2	1	14
Lorain	26,000	339	13.04	111	36	4	.....	.....	.....	1	.....	21	3	.....	.....
Mansfield	22,000	224	10.18	13	8	7	.....	.....	.....	.....	.....	2	5	.....	.....
Marietta	15,380	189	12.29	18	11	4	.....	.....	.....	.....	3	.....	1	3	4
Marion	17,000	197	11.59	23	9	7	1	.....	.....	.....	.....	.....	1	2	1
Martins Ferry	10,000	101	10.10	19	10	2	.....	.....	.....	.....	2	.....	.....	.....	.....
Massillon	14,400	136	9.44	23	6	6	.....	.....	.....	.....	1	3	2	1	.....
Middletown	10,000	106	10.60	14	3	.....	.....	.....	.....	.....	.....	3	.....	.....	.....
Mt. Vernon	10,000	81	8.10	2	4	1	.....	.....	.....	.....	.....	2	.....	.....	.....
Nelsonville	7,000	58	8.29	5	7	.....	.....	.....	.....	1	.....	.....	1	3	1
Newark	26,650	397	15.24	40	22	8	1	.....	.....	.....	3	2	1	11	7
New Philadelphia	9,000	93	10.33	.....	.....	3	.....	.....	.....	.....	.....	3	.....	.....	3
Niles	8,740	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norwalk	8,500	102	12.00	5	4	4	.....	.....	.....	.....	1	3	.....	.....	2
Norwood	13,000	113	9.42	6	6	.....	.....	.....	.....	1	.....	1	4	.....	.....
Painesville	6,000	108	18.00	2	4	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Piqua	13,000	158	12.15	18	3	2	.....	.....	.....	.....	3	6	.....	.....	.....
Portsmouth	22,000	283	12.91	43	21	16	1	.....	.....	.....	.....	.....	.....	.....	.....
St. Marys	6,500	55	8.46	11	3	2	.....	.....	.....	.....	1	3	7	.....	.....
Salem	8,600	90	10.47	6	9	3	.....	.....	.....	.....	.....	.....	.....	1	2
Sandusky	20,140	257	12.76	39	15	3	.....	.....	.....	.....	4	3	2	1	4
Sidney	6,000	95	15.83	19	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Springfield	45,000	569	12.64	50	44	11	1	.....	.....	.....	2	4	7	3	5
Steubenville	22,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tiffin	13,000	142	10.92	7	2	.....	.....	.....	.....	.....	2	.....	.....	.....	.....
Toledo	164,264	1,822	11.46	358	107	71	5	.....	.....	1	6	4	19	18	16
Troy	6,436	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Urbana	7,500	104	13.86	9	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Van Wert	8,000	83	10.37	.....	.....	7	.....	.....	.....	.....	.....	.....	1	.....	3
Warren	12,000	106	8.83	1	3	2	1	.....	.....	1	.....	1	.....	2	1
Wash'gton C. H.	5,756	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wellston	9,513	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wellsville	10,000	89	8.90	12	10	2	.....	.....	.....	.....	.....	1	4	.....	.....
Wooster	6,144	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Xenia	10,000	143	14.30	1	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....

AND THEIR CAUSES DURING 1905.

General Diseases.					Diseases of Re- spiratory System.		Diseases of Digestive System.	Diseases of Genito- urinary System.	Furberal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.	Diseases of Nervous System.	Diseases of Circu- latory System.											
33	14	128	...	12	81	72	51	14	56	33	2	1	1	2	43	12	54
112	...	5	...	1	1	17	12	1	4	13	...	...	...	...	8	15	3
16	...	5	...	...	24	9	17	4	4	21	5	...	...	10	32	13	10
21	1	...	...	6	18	17	32	2	29	13	...	...	...	3	17	1	24
...
12	1	1	1	9	12	4	3	1	1	1	...	...	...	9	1	...	1
18	1	2	1	9	12	5	4	2	11	3	...	...	...	6	...	...	8
...
27	1	5	4	20	58	54	30	15	56	23	...	...	...	...	14	27	32
19	...	11	...	31	31	20	16	3	18	8	...	...	...	...	12	3	1
878	57	231	17	82	468	313	731	248	378	394	61	21	9	300	273	421	10
558	40	162	12	347	817	543	665	231	930	402	51	28	40	306	290	448	104
238	33	90	6	47	217	242	199	40	197	95	9	2	12	51	79	134	19
7	1	...	...	4	7	14	13	1	10	5	...	...	1	1	13	1	4
...
15	...	3	...	...	8	11	7	...	6	3	...	...	...	...	...	...	...
17	...	6	3	...	10	15	10	2	8	10	...	...	...	...	...	...	...
39	...	8	...	13	46	41	36	10	24	10	...	...	...	...	...	...	...
5	...	10	3	...	13	12	5	1	7	6	...	...	...	...	...	...	...
38	...	15	...	...	40	19	8	9	16	13	...	...	...	...	...	...	...
11	...	1	...	9	5	27	7	2	17	2	...	...	...	...	...	...	...
10	...	6	...	...	16	25	8	...	14	5	...	...	...	...	...	...	...
14	...	7	...	10	11	6	...	...	11	1	...	...	...	...	...	...	...
10	...	1	...	23	9	21	...	...	1	1	...	...	...	...	...	...	...
6	...	3	...	...	...	15	3	...	...	...	...	...	...	...	...	...	...
41	...	17	...	...	39	22	46	...	27	...	...	...	...	...	...	...	...
32	...	5	...	...	19	22	18	...	20	1	...	...	...	...	...	...	...
7	30	9	...	...	17	1	...	...	...	...	...	...	...
39	...	3	...	...	4	17	...	...	13	4	...	...	...	...	...	...	...
40	...	11	9	...	23	34	30	15	7	7	...	...	...	...	...	...	...
21	...	10	...	...	49	30	30	6	26	3	...	...	...	...	...	...	...
21	...	13	...	...	36	30	14	5	36	10	...	...	...	...	...	...	...
23	...	8	...	...	31	13	1	...	9	5	...	...	...	...	...	...	...
17	...	10	...	...	18	21	10	...	17	1	...	...	...	...	...	...	...
13	...	1	...	...	13	22	1	...	5	1	...	...	...	...	...	...	...
8	...	7	...	...	17	4	...	...	6	1	...	...	...	...	...	...	...
11	...	11	...	...	12	3	3	...	9	9	...	...	...	...	...	...	...
12	...	4	...	...	11	1	4	...	4	1	...	...	...	...	...	...	...
4	...	2	...	...	12	1	2	...	1	1	...	...	...	...	...	...	...
57	...	18	...	...	43	37	15	...	16	4	...	...	...	...	...	...	...
1	...	5	...	...	9	16	3	...	5	2	...	...	...	...	...	...	...
...
8	12	13	7	...	13	...	...	...	...	...	...	...	...
18	14	10	6	...	5	...	...	...	...	...	...	...	...
6	10	15	1	...	1	...	...	...	...	...	...	...	...
27	17	31	20	...	9	5	...	...	...	...	...	...	...
30	...	14	...	...	17	35	7	...	15	9	...	...	...	...	...	...	...
3	...	3	...	...	10	9	13	...	5	1	...	...	...	...	...	...	...
7	...	4	...	...	6	9	6	...	11	9	...	...	...	...	...	...	...
12	...	9	...	...	50	33	14	...	15	9	...	...	...	...	...	...	...
13	...	4	...	...	12	9	7	...	6	...	...	...	...	...	...	...	...
79	...	35	...	...	28	53	40	...	27	6	...	...	...	...	...	...	...
...
19	...	11	...	...	25	14	7	...	7	...	...	...	...	...	...	...	...
176	...	37	...	...	254	156	139	...	255	118	...	...	...	...	...	...	...
...
8	...	9	...	...	16	14	2	...	14	5	...	...	...	...	...	...	...
14	12	8	5	...	5	...	...	...	...	...	...	...	...
6	...	5	...	...	21	13	9	...	11	5	...	...	...	...	...	...	...
...
9	...	2	...	...	20	14	10	...	7	...	...	...	...	...	...	...	...
13	...	6	...	...	35	21	...	...	9	17	...	...	...	...	...	...	...

ABSTRACT OF THE REPORTS OF DEATHS

Cities.	*Estimated population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.											
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.		
Youngstown . . .	60,000	969	16.15	259	106	30	....	....	2	14	9	40	6	5	....	
Zanesville	25,000	399	15.96	....	....	118	1	1	1	....	....	49	....	4	....	
Total.....	2,054,459	25,803	12.56	3,551	1,419	775	30	8	19	71	149	469	199	113	193		

*By Health Officers.

AND THEIR CAUSES DURING 1905—Continued.

General Diseases.					Diseases of Re- spiratory Systm.	Diseases of Diges- tive System.	Diseases of Genito- urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.			
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.															
61 30 6	27 14	4 4	44	95 33	94 35	127 34	30 3	134 28	39 15	4 4	1 1	1	6	64 26	71 21	26	84 17	
2,887	277	998	106	941	2,937	2,485	2,667	836	2,748	1,529	215	91	40	101	1,112	1,276	1,982	550	1,448

ABSTRACT OF THE REPORTS OF DEATHS

Villages.	•Estimated population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Aberdeen	700	5	7.14	...	...	...	...	...	...	...	...	...	...	...	...
Ada	3,300	24	7.27	...	...	2	...	...	...	...	...	1	1	...	...
Alger	850	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Amanda	570	5	8.77	...	...	...	...	...	...	...	...	...	...	...	...
Amelia	600	7	11.67	...	...	...	...	...	...	...	...	...	...	...	...
Anna	600	10	16.67	1	...	...	...	...	...	...	...	...	...	...	...
Ansonia	750	6	8.00	...	...	...	...	...	...	...	...	...	...	...	...
Antwerp	1,250	32	25.60	...	...	5	...	...	...	...	...	...	3	...	...
Apple Creek	400	6	15.00	...	...	12	...	...	...	...	...	...	...	...	...
Arcadia	500	6	12.00	...	...	...	...	...	...	...	...	...	...	...	...
Arcanum	1,500	15	10.00	...	...	...	...	...	...	...	...	...	...	...	...
Archbold	1,000	7	7.00	1	...	...	...	...	...	...	...	...	...	...	...
Arlington	900	13	14.44	...	3	...	...	...	...	3	2	...	...	...	...
Arlington Hgts	350	5	14.28	...	...	...	...	...	...	...	...	...	...	...	...
Arnottsville	200	7	35.00	...	...	...	...	...	...	...	...	...	1	...	...
Ashland	6,500	52	8.00	...	9	...	...	...	...	...	...	...	...	...	...
Ashley	800	8	10.00	...	...	...	...	...	...	...	...	...	...	...	...
Ashville	1,000	5	5.00	...	1	...	...	...	...	...	...	1	...	...	1
Athens	6,000	33	5.50	...	...	...	...	...	...	...	...	...	1	...	...
Attica	1,000	4	4.00	...	1	...	...	...	...	...	...	...	...	...	1
Avon	2,500	28	11.20	...	5	6	...	...	...	...	...	...	...	...	...
Bainbridge	1,000	21	21.00	...	3	...	...	...	...	...	1	1	...	...	...
Baltimore	525	12	22.86	...	...	1	...	...	...	...	...	...	...	...	...
Barberton	8,000	72	9.00	13	7	1	...	...	...	...	...	...	1	...	1
Batavia	1,200	19	15.83	3	...	1	...	...	...	...	...	...	...	...	...
Batesville	400	4	10.00	...	...	...	...	...	...	...	...	...	...	...	...
Beaver	300	6	20.00	...	4	...	...	...	...	...	...	...	...	...	...
Beaver Dam	500	9	18.00	...	...	...	...	...	...	...	...	...	...	...	...
Bedford	2,004	22	10.98	6	...	1	...	...	...	...	1	...	1	...	...
Belle Valley	650	5	7.70	...	3	...	...	...	...	...	...	...	...	...	...
Belmont	500	1	2.00	...	...	...	...	...	...	...	...	1	...	...	...
Beloit	500	5	10.00	1	...	...	...	...	...	...	...	...	...	...	...
Belpre	1,500	19	12.67	3	16	2	...	...	...	...	...	...	...	...	...
Berlin X Roads.	500	4	8.00	...	...	...	...	...	...	...	...	...	...	...	...
Berlin Heights	1,000	6	6.00	...	...	...	...	...	...	...	...	...	...	...	...
Bethel	1,100	12	10.90	2	2	...	...	...	...	...	...	1	...	...	...
Bettsville	503	6	11.73	...	...	...	...	...	...	...	...	...	...	...	...
Blanchester	2,000	33	16.50	3	...	...	...	...	...	...	...	...	...	...	2
Bloomdale	700	7	10.00	...	...	...	...	...	...	...	...	...	...	...	...
Bloomingsburg	600	2	3.33	...	...	...	...	...	...	...	...	...	...	...	...
Bluffton	2,000	17	8.50	4	...	...	...	...	...	...	2	...	...	...	1
Bolivar	700	3	4.29	...	...	...	...	...	...	...	...	...	...	...	...
Bowerston	600	5	8.33	1	...	...	...	...	...	...	...	...	...	...	...
Bowersville	400	6	15.00	...	...	...	...	...	...	...	...	...	...	...	...
Bradford	1,450	15	10.34	...	...	...	...	...	...	...	...	...	...	...	...
Bradner	1,200	20	16.67	7	...	...	...	...	...	...	1	...	...	...	...
Bratenahl	1,000	3	6.00	...	...	...	...	...	...	...	...	...	...	...	...
Bridgeport	4,000	54	13.50	7	2	4	...	...	...	...	...	1	...	...	...
Brooklyn H'gts	200	3	15.00	...	...	...	...	...	...	...	...	...	1	...	...
Brookville	1,000	6	6.00	1	...	1	...	...	...	...	...	...	...	...	1
Broughton	280	3	10.71	...	...	...	...	...	...	...	...	...	...	...	...
Bryan	3,900	48	12.30	...	...	1	...	...	...	...	...	...	...	...	...
Buchtel	1,000	7	7.00	...	...	...	...	...	...	...	...	...	...	...	...
Buffalo	1,000	17	17.00	...	4	1	...	...	...	...	...	...	...	...	...
Burbank	400	4	10.00	...	...	...	...	...	...	...	...	1	...	...	...
Burkettsville	300	1	3.34	...	...	...	...	...	...	...	...	...	...	...	...
Butler	800	6	7.50	...	...	...	...	...	...	...	...	...	...	...	...
Byesville	3,000	27	9.00	5	6	...	...	...	...	...	...	...	...	...	...
Cadiz	1,200	26	13.00	...	...	...	...	...	...	...	...	...	...	...	...
Caldwell	1,500	6	4.00	...	...	1	...	...	...	...	...	...	...	...	...
Caledonia	1,682	10	14.66	...	...	...	...	...	...	...	...	...	...	...	...
Camden	1,000	4	4.00	...	...	...	...	...	...	...	...	...	...	...	...
Canal Fulton	1,172	13	11.09	2	...	...	...	...	...	...	...	...	...	...	...
Cannelsville	700	2	2.86	...	...	...	...	...	...	...	...	...	...	...	...
Carey	2,000	32	16.00	7	3	...	...	...	...	...	...	2	...	...	...
Carrollton	2,000	26	13.00	1	4	1	...	...	...	...	...	...	...	...	...
Carthage	3,200	24	7.50	2	2	...	...	...	...	...	...	...	...	...	...
Casstown	300	3	10.00	1	...	...	...	...	...	...	...	...	...	...	...
Cecil	326	4	12.27	...	...	1	...	...	...	...	...	...	...	...	...

* By Health Officers.

ABSTRACT OF THE REPORTS OF DEATHS

Villages.	*Estimated population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Cedarville	1,250	30	24.00	8	2	2					1		1		1
Celina	4,000	40	10.00		3	2	1				1	1		1	
Centerburg	1,000	10	10.00											1	
Centerville	250	2	8.00												
Chagrin Falls	2,000	6	3.00			1									
Chester Hill	500	5	10.00		1										
Cheviot	1,000	11	11.00									1			
Chicago Junction	3,000	12	4.00		1										
Clarington	900	17	18.89		1	2									
Clarksburg	700	8	11.43	1											
Clarksville	465	19	40.86	4	3	2									
Cleves	1,500	19	12.67	1	4										1
Clinton	250	1	4.00												
Clyde	3,000	27	9.00												
Coal Grove	1,500	20	13.33	2	6	2						2		2	
Coalton	1,600	5	3.12												
College Hill	1,400	11	7.86			1									
Collinwood	6,000	56	9.33	16	7	3						6	1	1	1
Columbiana	1,339	12	8.96												
Columbus Grove	2,000	27	13.50	3	3	2									1
Congress	200	1	5.00												
Continental	1,104	4	3.62												
Convoy	800	4	5.00												
Corning	2,000	12	6.00	4	2										
Cortland	800	8	10.00												
Covington	2,000	19	9.50	1											
Crestline	3,500	55	15.71	8	5	3					1				
Creston	1,200	9	7.50	2											
Croton	400	2	5.00												
Crown City	250	1	4.00												
Custar	350	9	25.71	2											
Cuyahoga Falls	3,500	39	11.10	2							1				
Dalton	800	4	5.00												
Deavertown	1,300	8	6.15												1
DeGraff	1,200	20	16.67												
Delphos	5,000	49	9.80	15	1	1					1	1			
Deshler	1,800	20	11.11		2	3								2	
Dexter City	250	1	2.86												
Dillonvale	3,000	21	7.00	7	10	1					2	4			
Doylestown	1,206	22	18.23												
Dresden	1,600	20	12.50												
Dublin	370	5	13.50			1									
Dunkirk	1,200	21	17.50												1
East Cleveland	7,000	41	5.86	5	2	2									1
East Palestine	3,000	21	7.00			2									
Eaton	3,100	31	10.00												
Edgerton	1,200	10	8.33			1					1				
Edison	450	6	13.33									1			
Edon	900	14	15.56											1	
Eldorado	375	5	13.06										1		
Elida	500	2	4.00												
Elmore	1,000	16	16.00		1										
Elmwood Place	2,800	34	12.14	2	3										
Enon	250	5	20.00												
Fairport Harbor	2,300	43	18.61	1	9						3			6	
Farmersville	600	9	15.00	1	2										
Felicity	685	8	11.50												
Fern Bank	300	2	6.67												
Fletcher	400	7	17.50												
Flushing	1,000	16	16.00	2		2									
Fort Recovery	1,097	10	9.12	1			2								1
Frankfort	850	9	10.60	2	1										
Franklin	2,724	43	15.79	1		2							1	1	
Frazeysburg	700	7	10.00												
Fredericktown	1,000	14	14.00												
Gann	400	10	25.00		3		7								
Garrettsville	1,200	27	22.50	1									1		3
Geneva	2,400	29	12.08	2											
Germantown	2,000	23	11.50	2								2			

ABSTRACT OF THE REPORTS OF DEATHS

Villages.	*Estimated population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.										
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.	
Madisonville	4,200	45	10.71	...	2	3	...	...	...	2	1	...	...	...	...
Magnolia	800	13	16.25	3	1	...	...	...	...	...	...	...	...	...	...
Maineville	300	9	30.00	1	...	2	...	...	...	...	...	...	...	1	...
Malvern	1,000	8	8.00	2	...	...	...	...	...	...	...	...	...	...	...
Marblehead	1,200	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Marengo	286	1	3.50	...	...	...	...	...	...	...	...	1	...	...	...
Marseilles	500	10	20.00	...	...	...	1	...	...	...	...	...	...	...	1
Marshallville	500	9	18.00	2	...	...	...	...	...	...	...	...	...	...	...
Martinsburg	200	1	5.00	1	...	...	...	...	...	...	...	...	...	...	...
Maumee	3,000	30	10.00	...	...	...	...	...	...	...	...	...	...	...	...
Mechanicsburg	1,700	27	15.88	...	...	...	...	...	...	...	...	...	...	...	...
Medina	2,400	43	17.92	...	...	1	...	...	...	...	...	...	...	...	...
Mendon	800	14	17.50	...	...	...	...	...	...	...	...	...	...	...	...
Mentor	1,000	13	13.00	2	...	...	...	...	...	...	...	...	...	1	1
Middle Point	604	16	26.49	...	15	...	...	...	...	...	...	...	...	...	...
Middleport	3,500	44	12.57	3	...	...	...	...	...	...	...	1	...	1	2
Midland City	250	1	2.86	...	...	...	...	...	...	...	...	...	...	...	...
Milford	1,300	18	13.85	4	...	...	...	...	...	...	...	1	...	...	...
Milford Center	830	2	2.41	...	...	...	...	...	...	...	...	...	...	...	1
Millbury	300	3	10.00	1	...	...	...	...	...	...	...	...	...	...	...
Millersburg	1,998	34	17.10	1	...	...	...	...	...	4	...	...	...	...	...
Mineral Ridge	1,100	13	11.82	...	...	...	...	...	...	...	...	...	...	...	...
Minerva	1,400	20	14.29	3	1	1	...	...	...	...	...	...	...	...	...
Minster	1,575	15	9.52	...	...	1	...	...	...	...	...	...	...	...	...
Morristown	352	4	11.36	...	...	...	...	...	...	...	...	...	...	...	...
Morrow	900	20	22.22	2	1	...	...	...	...	...	...	1	...	...	...
Mt. Blanchard	500	3	6.00	...	...	...	...	...	...	...	...	...	...	...	...
Mt. Cory	340	5	14.71	...	...	...	...	...	...	...	...	...	...	...	...
Mt. Gilead	1,700	16	9.41	4	...	10	...	...	...	...	...	...	...	...	...
Mt. Healthy	1,800	14	7.78	4	2	...	...	...	...	...	...	...	...	...	...
Mt. Orab	700	12	17.14	1	...	...	...	...	...	...	...	...	...	1	...
Mt. Pleasant	800	1	1.25	...	...	...	...	...	...	...	...	...	...	...	...
Mt. Sterling	1,200	8	6.67	1	...	1	...	...	...	...	...	...	...	...	...
Mt. Washington	800	6	7.50	...	...	...	...	...	...	...	...	...	...	...	...
Murray City	1,300	18	13.85	5	5	...	...	...	...	...	...	...	...	...	...
Napoleon	5,000	26	5.20	...	...	1	...	...	...	...	1	...	...	1	...
Navarre	1,100	15	13.64	...	...	...	...	...	...	...	...	1	1	1	...
Nevada	1,000	3	3.00	...	...	...	...	...	...	...	...	...	...	...	...
New Bremen	2,000	26	13.00	5	1	...	...	...	...	...	...	...	...	...	...
Newcomerstown	3,500	41	11.71	1	3	3	...	2	...	...	...	...	...	1	...
New Lebanon	190	4	21.05	...	...	...	...	...	...	...	...	...	...	...	...
New Lexington	2,000	2	1.00	...	...	1	...	...	...	...	1	...	...	...	...
New London	1,500	27	18.00	...	...	...	...	...	...	...	...	1	2	...	...
New Madison	600	12	20.00	...	...	...	...	...	...	...	...	...	2	...	...
New Matamoras	800	6	7.50	...	...	1	...	...	...	...	...	...	...	...	...
New Paris	800	11	13.75	...	...	...	...	...	...	...	...	...	...	...	...
New Richmond	2,000	42	21.00	...	...	6	2	...	...	...	1	...	...	4	...
New Reigel	300	4	13.33	...	...	1	...	...	...	...	...	...	...	...	...
New Straitsville	2,500	28	11.20	...	...	2	...	...	...	1	...	...	...	...	...
Newton Falls	780	6	7.69	...	...	...	...	...	...	...	...	...	...	...	...
Newtown	700	3	4.29	...	...	...	...	...	...	...	...	...	...	...	...
New Vienna	800	7	8.75	...	...	...	...	...	...	1	...	...	...	...	...
New Weston	325	3	9.23	...	2	1	...	...	...	...	...	...	...	...	...
North Amherst	1,800	33	18.33	5	2	1	...	...	...	...	...	...	...	1	...
North Baltimore	3,500	32	9.14	4	2	1	...	...	...	...	1	...	...	1	1
North Bend	600	4	6.67	...	...	...	1	...	...	...	...	...	...	...	...
North Lewisburg	900	17	18.89	...	1	...	...	...	...	...	...	...	...	...	...
Nottingham	1,400	19	13.57	...	...	...	...	...	...	...	...	...	...	...	...
Oak Hill	1,100	18	16.36	...	...	...	...	...	...	...	2	...	2	...	...
Oakley	900	7	7.78	...	...	...	...	...	...	...	...	...	...	...	...
Oakwood	500	4	8.00	...	...	...	...	...	...	...	...	2	...	...	...
Oberlin	4,900	49	10.00	4	1	1	...	...	...	...	...	...	1	...	...
Ohio City	800	5	6.25	...	...	...	...	...	...	...	...	...	...	...	...
Olmsted Falls	413	2	4.84	...	...	...	...	...	...	...	...	...	...	1	...
Orangeville	200	2	10.00	...	...	...	...	...	...	...	...	...	...	...	...
Orrville	2,200	24	10.91	1	
Osgood	300	3	10.00	1	...	1	
Osnaburg	700	5	7.14	
Ostrander	500	15	30.00	2	

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Ottawa	2,300	10	4.35	1
Ottoville	200	13	65.00
Oxford	2,300	32	13.91
Palestine	300	3	10.00
Payne	1,353	11	8.11	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Peebles	850	9	10.59	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Perrysburg	1,800	25	13.99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philo	850	4	4.71	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Piketon	650	9	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pioneer	800	7	8.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plain City	1,800	15	6.33	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Plainfield	200	2	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pleasant Hill	700	10	14.29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pleasant Ridge	1,200	9	7.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pleasantville	500	7	14.00	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plymouth	1,170	9	7.70	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Poland	500	11	22.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pomeroy	4,700	60	12.77	6	5	3	2	.....	.....	.....	1	.....	2	.....	.....
Portage	600	7	11.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton	3,600	29	9.67	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Proctorville	525	6	11.43	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Prospect	1,100	18	16.36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Put-in-Bay	350	4	11.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quaker City	900	10	11.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quincy	800	3	3.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Racine	500	7	14.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ravenna	4,500	124	27.56	6	.....	.....	.....	.....	.....	.....	1	.....	1	1	.....
Reading	3,500	41	11.71	3	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Republic	475	8	16.80	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reynoldsburg	400	7	17.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....
Richmond	450	4	8.89	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Richwood	2,000	34	17.00	.....	1	3	.....	.....	.....	.....	.....	4	.....	.....	2
Ripley	3,000	41	13.67	.....	.....	4	.....	.....	.....	.....	.....	6	.....	.....	.....
Rising Sun	700	5	7.14	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rochester	300	6	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rock Creek	550	12	3.64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockford	1,400	12	8.57	.....	3	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockport	2,600	20	7.69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Rocky Ridge	450	3	6.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rocky River	1,250	11	8.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rome	220	3	13.64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Roseville	1,550	7	4.52	3	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Rushville	400	1	2.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sabina	1,800	41	22.78	.....	.....	6	4	.....	.....	.....	.....	.....	.....	5	.....
St. Bernard	3,900	48	12.31	8	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Clairsville	1,300	12	9.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louisville	350	5	14.28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paris	1,400	24	16.85	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salesville	228	3	13.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salineville	2,800	34	12.14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savannah	300	12	6.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Scott	547	3	5.48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sebring	2,000	14	7.00	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seven Mile	400	3	7.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shanesville	500	2	4.00	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shawnee	3,000	30	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shelby	6,000	84	14.00	4	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sherodsville	925	13	14.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shreve	1,130	15	13.27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silverton	300	2	6.67	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Smithville	475	10	21.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Somerset	1,100	35	31.82	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....
Somerville	370	5	13.51	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Zanesville	600	6	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springboro	500	6	12.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spring Valley	600	7	11.66	1	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....
Stockport	400	3	7.50	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Strasburg	1,000	11	11.00	1
Struthers	2,800	23	8.21	4	5	3	4	1

ABSTRACT OF THE REPORTS OF DEATHS

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Stryker	1,450	5	3.45
Sugar Creek	400	4	10.00
Sugar Grove	400	3	7.50
Sylvania	1,000	8	8.00	1
Tarleton	350	3	8.57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Thornville	450	12	4.44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tippecanoe City	2,000	31	15.50	4	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Toronto	6,000	14	2.33	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trenton	550	7	12.73	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trimble	700	6	8.57	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trotwood	350	5	14.28	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Uhrichsville	5,000	43	8.60	1	9	1	.....	.....	.....	.....	.....	1	.....	2	.....
Union City	1,500	22	14.67	4	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Unionville Center	300	4	13.33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unioopolis	500	4	8.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Upper Sandusky	3,900	44	11.28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Utica	2,000	19	9.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vandalia	400	4	10.00	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermilion	1,450	10	6.89	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Versailles	1,500	12	8.00	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vienna Cross Rds	325	6	18.46	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wadsworth	2,500	35	14.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Waldo	275	5	18.18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wapakoneta	5,000	58	11.60	8	4	.....	.....	.....	.....	.....	.....	1	1	.....	3
Washington	400	5	12.50	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washingtonville	1,092	8	7.33	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Waverly	1,896	14	7.38	.....	.....	1	.....	.....	.....	.....	.....	1	1	.....	.....
Waynesburg	700	11	15.71	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Waynesfield	650	6	9.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Waynesville	800	13	16.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wellington	2,200	42	19.09	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
West Alexandria	1,200	15	12.50	.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Carrollton	1,200	6	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Westerville	2,000	14	7.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
W. Farmington	700	16	22.86	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
West Jefferson	950	11	11.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Mansfield	1,200	10	8.33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Milton	1,500	12	8.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
West Salem	700	13	18.57	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
West Union	1,200	3	2.50	.....	3	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
West Unity	897	8	8.92	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wharton	600	2	3.33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whitehouse	620	16	25.81	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Williamsburg	1,085	12	11.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Williamsport	600	13	21.67	3	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Willoughby	2,000	23	11.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Willshire	850	1	1.18	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington	4,500	19	4.22	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Winchester	1,000	24	24.00	2	2	.....	.....	.....	.....	.....	.....	1	.....	2	.....
Windham	350	2	5.71	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woodsfield	2,800	31	11.07	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....
Woodstock	400	3	7.50	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woodville	1,000	6	6.00	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wren	275	5	18.18	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Wyoming	1,800	18	10.00	4	2	.....	.....	.....	.....	.....	.....	.....	2	1	.....
Yellow Springs	1,400	26	18.57	1	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Yorkshire	150	3	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Zanesfield	300	3	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Zoar	196	4	20.41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	541,541	5,965	11.01	426	313	193	26	.....	3	13	43	87	63	72	57

*By Health Officers.

ABSTRACT OF THE REPORTS OF DEATHS

658 Townships.	Census population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Adams—															
Franklin	1,572	3	1.91	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jefferson	3,946	4	1.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manchester	67	4	59.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Meigs	2,350	6	2.55	.....	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sprigg	2,203	1	.45	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tiffin	1,602	1	.62	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winchester	936	14	14.96	3	2	1	.....	.....	.....	.....	.....	.....	1	1	.....
Allen—															
Amanda	1,384	5	3.62	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bath	1,517	20	13.20	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....
Jackson	1,615	2	1.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marion	2,284	1	.44	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Richland	1,839	14	7.61	2	1	.....	.....	.....	.....	.....	.....	.....	.....	3	.....
Shawnee	1,432	8	5.36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spencer	1,142	9	7.88	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ashland—															
Green	1,206	8	6.62	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hanover	941	2	2.14	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....
Jackson	923	10	10.87	.....	1	.....	.....	.....	.....	.....	1	.....	1	.....	.....
Lake	684	11	16.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milton	869	6	6.91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mohican	1,123	5	4.45	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Orange	1,201	9	7.49	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Perry	1,124	3	2.66	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sullivan	808	7	8.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermilion	1,230	11	8.94	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....
Ashtabula—															
Andover	719	23	32.00	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ashtabula	1,038	24	23.10	2	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Austintown	1,040	9	8.68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Cherry Valley	643	2	3.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colebrook	773	10	12.93	.....	.....	1	.....	.....	.....	.....	.....	.....	3	.....	1
Conneaut	2,392	38	15.90	.....	.....	5	2	.....	.....	.....	.....	2	.....	.....	.....
Denmark	703	3	4.28	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Geneva	1,254	7	5.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harpersfield	893	6	6.72	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kingsville	1,412	17	12.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lenox	742	11	14.81	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morgan	562	12	21.33	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
New Lyme	837	12	14.39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pierpont	931	12	12.89	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Plymouth	723	9	12.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Richmond	848	15	17.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rome	589	5	5.09	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trumbull	855	6	7.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wayne	685	17	24.83	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Williamsfield	900	15	16.66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Windsor	911	10	10.98	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Athens—															
Alexander	1,173	9	7.68	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	1	.....
Ames	1,256	1	.79	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bern	1,660	2	1.21	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....
Carthage	1,136	8	7.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Dover	1,488	10	6.71	1	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rome	1,767	14	7.92	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Troy	3,762	5	1.34	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
Waterloo	2,508	23	9.17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
York	3,762	26	6.89	6	2	.....	.....	.....	.....	.....	1	2	.....	.....	.....
Auglaize—															
Clay	1,647	2	1.21	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duchouquet	1,636	14	8.58	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....
German	893	11	12.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goshen	908	11	12.12	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jackson	731	4	5.47	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Noble	1,360	8	5.88	1	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Pusheta	1,275	4	3.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Salem	959	4	4.16
Belmont—															
Colerain	2,987	9	3.01	3	5	5	4

ABSTRACT OF THE REPORTS OF DEATHS

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ABSTRACT OF THE REPORTS OF DEATHS

Townships.	Census population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Coshocton—															
Concluded.															
Tiverton	876	5	5.72	2	...	...	...	...	...	...	...	...	...	...	...
Tuscarawas	1,866	8	4.27	...	...	1	1	...	...	...	...	...	...	...	...
White Eyes	1,033	11	10.63	...	...	1	...	...	...	...	...	...	...	...	...
Crawford—															
Cranberry	995	3	3.01	...	...	1	...	...	...	...	...	...	...	...	...
Holmes	1,500	8	5.33	5	...	...	...	...	...	...	...	...	...	...	...
Jefferson	697	9	12.91	...	...	...	...	...	...	...	...	...	...	...	...
Liberty	1,566	10	6.34	...	...	1	...	...	...	...	...	...	...	...	...
Lykens	930	2	2.15	1	...	...	...	...	...	...	...	...	...	...	...
Sandusky	569	3	5.27	...	...	...	...	...	...	...	...	...	...	...	...
Texas	516	3	5.81	...	...	...	...	...	...	...	...	...	...	...	...
Tod	882	12	13.58	...	...	...	...	...	...	...	...	...	...	...	...
Vernon	926	7	7.57	...	...	1	...	...	...	...	...	...	...	...	...
Cuyahoga—															
Bedford	1,140	4	3.51	...	...	1	...	...	...	...	...	1	...	...	...
Brecksville	1,053	13	12.35	...	1	...	...	...	...	...	...	...	...	...	...
Chagrin Falls	414	3	7.25	...	...	...	...	...	...	...	...	...	...	...	...
Dover	2,233	11	4.93	...	...	1	1	...	...	1	...	...	...	...	...
Euclid	2,634	23	8.73	3	...	...	...	...	...	...	...	...	...	...	...
Olmsted	1,614	2	1.24	...	...	1	...	...	...	...	...	...	...	...	...
Parma	1,488	5	3.36	...	...	...	...	...	...	...	...	...	...	...	...
Royalton	1,128	9	7.99	...	...	...	...	...	...	...	...	...	...	...	...
Solon	903	12	13.29	...	...	...	...	...	...	...	...	...	2	...	...
Strongsville	1,178	14	11.88	...	...	...	...	...	...	...	...	...	...	...	...
Warrensville	1,634	7	4.28	1	...	...	...	...	...	...	...	...	...	...	...
Darke—															
Adams	1,954	5	2.56	1	3	...	...	...	...	...	...	...	...	...	...
Butler	1,654	9	5.42	...	...	...	...	...	...	...	...	...	...	...	...
Franklin	1,635	10	6.11	...	1	1	...	...	...	...	...	...	...	...	...
German	1,376	2	1.46	...	...	...	...	...	...	...	...	...	...	...	...
Greenville	2,940	34	11.56	...	2	...	...	...	...	...	...	1	...	...	2
Harrison	1,212	7	5.88	...	...	1	...	...	...	...	...	...	...	1	...
Jackson	1,516	11	7.26	...	...	1	...	...	...	...	...	...	...	...	...
Mississinawa	1,462	7	4.79	...	...	...	...	...	...	...	...	...	...	...	...
Monroe	1,352	8	5.92	...	...	...	...	...	...	...	...	...	...	...	...
Neave	1,033	2	1.94	...	...	...	...	...	...	...	...	...	...	...	1
Patterson	1,475	2	1.35	1	...	...	...	...	...	...	...	...	...	...	...
Richland	1,217	4	3.29	...	...	1	...	...	...	...	...	...	...	1	...
Twin	1,448	25	17.12	...	...	1	...	...	...	...	...	...	...	...	1
Wabash	1,334	5	3.75	1	1	1	...	...	...	...	...	...	...	1	1
Washington	1,343	11	8.19	1	...	...	...	...	...	...	...	...	...	...	...
Wayne	1,371	7	5.11	...	1	...	...	...	...	...	...	...	...	...	...
York	942	6	6.37	...	...	...	...	...	...	...	...	...	...	...	...
Defiance—															
Mark	1,685	7	4.15	...	...	1	...	...	...	...	...	...	...	...	...
Milford	1,164	6	5.15	...	1	...	...	...	...	...	...	1	...	...	...
Noble	810	3	3.70	...	...	...	...	...	...	...	...	...	...	...	...
Richland	1,444	1	.69	...	...	...	...	...	...	...	...	...	...	...	...
Tiffin	1,514	4	2.64	...	...	...	...	...	...	...	...	...	...	...	...
Washington	1,265	7	5.52	...	...	1	...	...	...	...	...	...	...	...	...
Delaware—															
Concord	1,305	5	3.83	1	...	...	...	...	...	...	...	...	...	...	...
Harlem	1,005	9	8.95	...	...	4	...	...	...	...	...	...	...	...	...
Kingston	629	13	20.07	...	...	1	...	...	...	...	...	...	...	...	...
Liberty	1,379	1	.73	...	...	...	...	...	...	...	...	1	...	...	...
Orange	976	19	19.41	1	1	2	...	...	...	...	...	...	...	...	1
Porter	738	8	10.80	...	...	3	...	...	...	...	...	...	...	...	...
Radnor	1,132	6	5.29	...	...	...	...	...	...	...	...	...	...	...	...
Thompson	709	8	11.28	...	1	...	...	...	4	...	...	...	...	...	...
Trenton	869	2	2.30	...	...	2	...	...	...	...	...	...	...	...	...
Erie—															
Huron	726	2	2.76	...	...	...	...	...	...	...	...	...	...	...	...
Oxford	950	2	2.11	1	...	...	...	...	...	...	...	...	...	...	...
Fairfield—															
Berne	2,031	5	2.45	...	...	...	...	...	...	...	...	...	...	...	...
Bloom	1,500	25	16.67	...	4	1	...	...	...	4	...	...	...	...	...
Clear Creek	1,810	20	10.10	1	...	1	...	...	...	...	...	...	...	...	...
Greenfield	1,563	6	3.84	...	...	1	...	...	...	...	...	1	...	...	...

AND THEIR CAUSES DURING 1905—Continued.

General Diseases.					Diseases of Re- spiratory System.	Diseases of Circu- latory System.	Pneumonia.	Other Respiratory Diseases.	Diseases of Diges- tive System.	Diseases of Genito- urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.															
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			12	3	1			1	1						1	4	1	1	
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1			1		2				1	3						2	1		
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ANNUAL REPORT

ABSTRACT OF THE REPORTS OF DEATHS

Townships.	Census population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.										
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.	
Fairfield—																
Concluded.																
Liberty	2,352	1	8.43	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madison	1,127	10	8.87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Richland	956	7	7.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rush Creek	1,390	12	8.62	4	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Walnut	2,199	1	2.23	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Fayette—																
Concord	733	2	2.73	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green	701	5	7.12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jasper	1,446	13	8.91	.....	.....	1	.....	.....	.....	.....	.....	.....	1	1	.....	.....
Madison	1,317	8	6.08	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Marion	932	12	2.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin—																
Brown	800	3	3.75	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin	2,686	3	1.12	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Jackson	1,633	4	2.45	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marion	5,513	13	2.36	.....	.....	1	.....	.....	.....	.....	1	2	.....	.....	.....	.....
Norwich	1,105	10	9.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Perry	1,676	2	1.20	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plain	939	4	4.26	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Sharon	1,356	10	.74	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fulton—																
Franklin	1,138	2	1.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pike	1,147	10	8.72	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Royalton	1,198	6	5.01	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Swan Creek	1,881	2	1.06	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gallia—																
Cheshire	1,851	7	3.78	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green	1,257	9	7.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greenfield	1,253	13	10.38	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morgan	1,232	9	7.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Ohio	1,580	2	1.27	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....
Geauga—																
Bainbridge	758	2	2.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Burton	634	2	3.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chester	716	6	8.18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claridon	764	13	17.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hampden	603	7	11.61	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huntsburg	809	9	11.12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Munson	780	8	10.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Parkman	849	8	9.42	.....	2	1	.....	.....	.....	.....	.....	.....	.....	1	1	.....
Russell	695	4	5.76	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Thompson	909	16	17.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
Troy	897	10	11.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greene—																
Cesar Creek	1,039	4	3.87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cedarville	1,278	8	6.26	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ross	1,141	8	6.99	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Creek	1,109	6	5.41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spring Valley	938	6	6.40	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Guernsey—																
Adams	717	4	5.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jackson	1,198	31	25.88	4	1	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
Knox	845	8	9.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monroe	893	2	2.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	572	2	3.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2	.....	.....
Hamilton—																
Anderson	3,753	25	6.66	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colerain	3,410	33	9.67	4	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Columbia	2,298	11	4.80	1	1	.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....
Crosby	833	3	3.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green	4,532	39	8.61	3	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	3	.....
Harrison	636	3	4.72	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mill Creek	5,304	28	5.28	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spencer	257	3	11.70	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Springfield	3,929	21	5.34	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Symmes	1,109	5	4.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whitewater	1,291	13	10.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

AND THEIR CAUSES DURING 1905—Continued.

[illegible]

ABSTRACT OF THE REPORTS OF DEATHS

Townships.	Census population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Hancock—															
Big Lick	1,156	6	5.20	....	....	....	....	....	....	....	....	....	....	....	....
Delaware	1,056	9	8.52	....	....	3	1	....	....	....	....	....	....	....	....
Madison	1,009	5	4.96	....	1	....	....	....	....	1	....	....	....	....	....
Pleasant	1,503	12	7.98	....	....	1	....	....	....	....	....	....	....	....	....
Van Buren	789	11	13.95	....	....	....	....	....	....	1	....	....	....	....	....
Hardin—															
Dudley	1,320	7	5.30	....	....	....	....	....	....	....	....	....	....	....	....
Liberty	1,410	14	9.94	....	....	1	....	....	....	....	....	....	....	1	....
McDonald	1,947	2	10.25	1	....	....	....	....	1	....	....	....	....	....	....
Marion	1,098	2	1.84	....	....	....	....	....	....	....	....	....	....	....	....
Pleasant	1,418	2	1.41	....	....	....	....	....	....	....	....	....	....	....	....
Taylor Creek ..	864	5	5.79	1	....	1	....	....	....	....	....	....	....	....	....
Harrison—															
Archer	700	3	4.29	....	....	....	2	....	....	....	....	....	....	....	....
Franklin	677	8	11.80	1	....	....	....	....	....	....	....	....	....	....	....
German	1,203	10	8.32	1	....	2	....	....	....	....	....	....	....	....	....
Green	1,103	13	11.80	1	....	2	....	....	....	....	....	....	1	1	....
Moorefield	1,222	16	13.05	3	....	....	....	....	....	....	....	....	....	1	....
Short Creek	1,358	1	.74	....	....	....	....	....	....	....	....	1	....	1	....
Stock	591	2	3.39	....	....	....	....	....	....	....	1	....	....	....	....
Washington	1,247	21	16.84	....	....	1	....	....	....	....	....	1	....	....	....
Henry—															
Bartlow	1,430	1	.69	....	....	....	....	....	....	....	....	....	....	....	....
Flat Rock	1,359	24	17.64	4	....	....	....	....	1	....	....	....	....	1	....
Marion	1,568	13	8.30	1	2	....	....	....	....	....	....	....	....	....	....
Richfield	1,708	4	2.35	....	....	....	....	....	....	....	....	....	....	1	....
Ridgeville	1,241	15	12.05	2	....	....	....	....	....	....	....	....	....	....	....
Washington	1,188	17	14.30	2	1	1	....	....	....	....	....	3	....	....	....
Highland—															
Brush Creek	1,476	4	2.71	....	....	....	....	....	....	....	....	....	1	....	....
Hamer	918	5	5.55	....	....	....	....	....	....	....	....	....	....	....	....
Jackson	912	11	12.01	1	1	....	....	....	....	....	....	....	....	....	....
Paint	2,226	9	3.99	....	....	....	....	....	....	....	....	....	....	....	....
Salem	869	4	4.60	1	....	....	....	....	....	....	....	....	....	....	....
White Oak	1,228	2	1.62	....	2	....	....	....	....	....	....	2	....	....	....
Hocking—															
Falls	1,735	9	5.19	1	4	....	....	....	....	....	....	9	....	....	....
Good Hope	1,277	4	3.14	2	2	1	....	....	....	....	....	1	....	....	....
Perry	1,531	2	1.32	....	2	....	....	....	....	....	....	....	....	....	....
Salt Creek	1,509	14	9.29	1	2	2	....	....	....	....	1	1	....	....	....
Starr	1,529	3	1.96	....	1	1	....	....	....	....	....	....	....	....	....
Ward	6,022	33	5.29	2	4	1	....	....	....	....	....	3	....	....	2
Holmes—															
German	1,549	1	.65	....	....	1	....	....	....	....	....	....	....	....	....
Mechanic	1,213	10	8.24	....	....	....	....	....	....	....	....	....	....	....	....
Paint	1,179	9	7.63	....	....	1	....	....	....	....	....	....	....	....	....
Prairie	937	9	9.60	....	....	....	....	....	....	....	....	....	....	....	....
Richland	1,023	8	7.80	....	....	....	....	....	....	....	....	....	....	....	....
Salt Creek	1,355	7	5.17	....	2	2	....	....	....	....	....	....	....	....	....
Walnut Creek ..	1,609	6	3.62	....	1	....	....	....	....	....	....	....	....	....	....
Washington	1,019	4	3.94	....	....	....	....	....	....	....	....	....	....	....	....
Huron—															
Bronson	824	6	7.28	....	....	....	....	....	....	....	....	....	....	....	....
Clarksfield	1,051	10	9.95	....	1	1	....	....	....	....	....	....	....	....	....
Fairfield	1,116	13	11.65	....	....	....	....	....	....	....	....	....	....	....	....
Fitchville	475	4	8.42	1	....	....	....	....	....	....	....	....	....	....	....
Greenfield	706	3	4.25	....	....	....	....	....	....	....	....	....	....	....	....
Townsend	977	9	9.21	....	....	....	....	....	....	....	....	....	....	....	....
Jackson—															
Lick	1,326	17	12.82	....	....	....	....	....	....	....	....	....	....	....	....
Madison	1,328	22	16.50	1	2	5	....	....	....	....	....	....	6	....	....
Milton	2,304	3	1.30	....	....	....	....	....	....	....	....	....	....	....	....
Washington	1,151	2	1.86	....	....	....	....	....	....	....	....	....	....	....	....
Jefferson—															
Ross	617	2	3.15	....	....	2	....	....	....	....	....	....	....	....	....
Salem	1,086	5	4.51	1	2	....	....	....	....	....	....	....	....	....	....
Saline	1,128	4	3.55	....	....	....	....	....	....	....	....	....	....	....	....
Smithfield	1,434	12	8.51	5	4	....	....	....	....	....	1	2	2	....	....
Springfield	1,073	2	1.85	....	....	....	....	....	....	....	....	1	....	1	....

ABSTRACT OF THE REPORTS OF DEATHS

[illegible]

AND THEIR CAUSES DURING 1905—Continued.

General Diseases.					Diseases of Respiratory System.	Diseases of Digestive System.	Diseases of Genito-urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.												
1	1													1	1	2
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ANNUAL REPORT

ABSTRACT OF THE REPORTS OF DEATHS

[illegible]

AND THEIR CAUSES DURING 1905—Continued.

General Diseases.					Diseases of Re- spiratory System.	Diseases of Digestive System.	Diseases of Genito- urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.												
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					13											

ABSTRACT OF THE REPORTS OF DEATHS

Townships.	Census population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.										
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.	
Stark—																
Concluded.																
Lawrence	2,972	10	11.34	.....	12	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lexington	1,195	11	9.21	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nimishillen	1,839	25	13.60	4	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Osnaburg	1,608	14	8.70	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paris	1,727	9	5.22	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Perry	3,205	14	4.37	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pike	1,491	16	10.73	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plain	3,624	35	9.66	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sandy	637	4	6.28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sugar Creek	1,836	11	5.99	1	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tuscarawas	4,139	35	8.45	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	1,668	10	5.99	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Summit—																
Copley	802	12	1.45	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coventry	1,790	10	5.49	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin	2,024	18	8.50	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green	1,602	8	5.00	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hudson	657	8	12.18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northampton	814	2	2.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northfield	1,050	6	5.70	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stow	976	7	7.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tallmadge	1,363	11	8.07	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Twinsburg	805	5	6.21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trumbull—																
Bazetta	706	9	12.75	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Braceville	867	7	10.27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bristol	1,035	10	9.66	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brookfield	1,781	6	3.34	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fowler	764	7	9.18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greene	841	5	5.96	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gustavus	844	12	14.27	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hubbard	1,441	13	9.02	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnston	753	18	23.80	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lordstown	722	6	8.32	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mecca	789	13	16.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vernon	824	3	3.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vienna	942	7	7.43	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tuscarawas—																
Auburn	984	7	7.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bucks	1,223	15	12.26	1	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin	962	6	6.46	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goshen	2,266	1	1.44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jefferson	928	6	6.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mill	549	13	23.68	3	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sugar Creek	1,747	2	1.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union	825	3	3.64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Warren	796	2	2.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Warwick	1,632	12	7.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	784	5	6.38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wayne	1,132	1	1.88	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union—																
Allen	957	6	6.27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claibourne	1,401	12	8.50	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Darby	950	6	6.12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jerome	1,307	1	1.77	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mill Creek	688	5	7.27	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	1,186	3	2.53	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Van Wert—																
Harrison	1,445	8	5.53	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hoglin	1,608	5	3.11	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jackson	1,238	11	8.90	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jennings	1,338	7	5.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pleasant	1,336	15	11.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tully	1,736	7	4.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
York	1,316	8	6.08	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vinton—																
Brown	746	7	9.38	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clinton	1,010	4	3.96	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

ABSTRACT OF THE REPORTS OF DEATHS

Townships.	Census population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Vinton—															
Concluded.															
Eagle	1,073	6	5.60	...	1	2	...	...	...	...	...	1	...	...	...
Knox	953	8	8.39	2	...	1	...	...	...	...	...	...	...	...	...
Madison	654	6	9.17	...	...	...	...	...	...	...	...	1	...	...	...
Swan	979	1	1.20	...	...	...	...	...	...	...	...	1	...	...	...
Vinton	1,336	4	2.92	...	...	...	...	...	...	...	...	...	...	...	...
Warren—															
Clear Creek ..	1,987	19	9.56	2	...	1	...	...	...	...	...	...	...	...	...
Deerfield	1,539	11	7.15	...	...	...	...	...	...	...	...	...	...	1	...
Franklin	1,791	10	5.60	...	...	...	...	...	...	...	...	...	...	...	...
Hamilton	1,693	11	6.49	...	...	...	...	...	...	...	...	1	...	...	...
Harlan	1,650	17	10.30	...	...	...	...	...	...	...	...	...	...	...	...
Salem	916	10	10.91	...	...	...	...	...	...	...	...	...	...	...	...
Washington	1,062	6	5.65	...	...	1	...	...	...	...	...	...	...	...	...
Wayne	1,598	11	6.88	...	...	1	...	...	...	...	...	...	...	...	...
Washington—															
Aurelius	806	2	2.48	...	...	...	...	...	...	...	...	...	...	...	...
Belpre	2,761	45	16.30	1	...	5	...	...	...	...	3	...	2	...	...
Decatur	1,276	5	3.92	...	...	...	...	...	...	...	...	...	...	...	...
Fairfield	758	1	1.22	...	...	...	...	...	...	...	...	...	...	...	...
Grandview	2,015	2	.99	...	1	1	...	...	...	...	...	...	...	...	...
Lawrence	1,726	4	2.31	...	...	...	...	...	...	...	...	...	...	...	...
Liberty	1,461	12	8.21	...	...	...	...	...	...	...	...	...	...	...	1
Ludlow	1,237	1	.81	...	...	...	...	...	...	...	...	...	...	...	...
Marietta	2,416	32	13.24	3	18	6	...	...	...	...	...	1	...	...	1
Newport	2,564	5	1.95	...	...	...	...	...	...	...	...	...	...	...	...
Salem	1,310	20	15.26	3	2	2	...	...	...	...	...	...	...	...	...
Warren	1,813	20	11.03	1	2	2	...	...	...	...	...	...	...	...	...
Waterford	1,557	22	14.20	...	...	...	...	...	...	...	...	...	...	...	...
Wesley	1,223	7	5.29	...	...	1	...	...	...	...	...	...	...	...	...
Wayne—															
Chester	1,648	14	8.49	...	...	...	...	...	...	...	...	...	2	...	...
Chippewa	1,818	11	6.05	...	1	...	...	...	...	...	1	...	...	...	...
Clinton	985	4	4.06	...	...	...	...	...	...	...	...	...	...	...	...
East Union	1,418	15	10.57	...	...	1	...	...	...	...	...	...	...	...	...
Franklin	1,202	1	.83	...	...	1	...	...	...	...	...	...	...	...	...
Green	2,090	19	9.03	...	1	1	...	...	...	...	...	...	...	...	...
Milton	1,978	5	2.53	...	...	1	...	...	...	...	...	...	...	...	...
Paint	1,044	10	9.56	...	...	...	...	...	...	...	...	...	...	...	...
Salt Creek	1,045	18	17.22	3	...	...	...	...	...	...	...	...	...	...	...
Sugar Creek	1,608	13	8.08	1	2	...	...	...	...	...	...	...	...	...	...
Wayne	1,717	7	4.08	...	...	...	...	...	...	...	...	...	...	...	...
Williams—															
St. Joseph	1,090	19	17.43	...	...	2	...	...	...	...	...	...	...	...	...
Superior	1,125	1	.88	...	1	...	...	...	...	...	...	1	...	...	...
Wood—															
Freedom	1,184	6	5.07	...	...	2	...	...	...	...	...	...	...	...	...
Jackson	1,448	7	4.83	...	1	...	...	...	...	...	...	...	...	...	...
Lake	1,703	6	3.52	2	...	...	...	...	...	...	...	...	...	...	...
Liberty	2,870	6	2.09	...	...	...	...	...	...	...	...	2	...	...	...
Milton	1,554	22	14.16	3	...	...	...	...	...	...	...	...	1	...	...
Montgomery	1,637	23	14.05	...	...	...	...	...	...	...	...	...	...	...	...
Perry	1,290	8	6.20	...	1	2	...	...	...	...	...	...	...	...	...
Perrysburg	2,514	18	7.12	1	...	1	...	...	...	...	...	...	1	1	...
Plain	1,120	3	2.68	...	...	...	...	...	...	...	...	1	1	...	...
Washington	868	7	8.06	...	...	...	...	...	...	...	...	...	...	...	...
Webster	1,303	5	3.84	...	...	...	...	...	...	...	...	...	...	...	...
Weston	659	27	41.00	1	1	1	...	...	...	...	...	...	...	...	...
Wyandot—															
Crawford	970	5	5.16	2	...	1	...	...	...	...	...	...	...	...	...
Eden	1,176	13	11.05	1	1	1	...	...	...	...	2	...	...	...	...
Miffin	1,067	4	3.75	2	...	...	...	...	...	...	...	...	...	1	...
Richland	1,036	5	4.82	...	...	1	...	...	...	...	...	...	...	...	...
Salem	1,190	2	1.68	...	1	...	...	...	...	...	...	...	...	...	...
Total.....	874,906	5,955	6.81	339	306	235	20	3	29	14	42	177	76	55	46

ABSTRACT OF THE REPORTS OF DEATHS

	Estimated population.	Total deaths.	Annual rate per 1,000.	Age.		General Diseases.									
				Under one.	One to five.	Typhoid Fever.	Malarial Fever.	Smallpox.	Measles.	Scarlet Fever.	Whooping Cough.	Diphtheria and Croup.	Grippe.	Dysentery.	Purulent and Septicemic Infections.
Cities (59).....	2,054,459	25,803	12.56	3,551	1,419	775	30	8	19	71	149	469	199	113	193
Villages (405).....	541,541	5,965	11.01	426	313	193	26	..	3	13	43	87	63	72	57
Townships (658)...	874,906	5,955	6.81	339	306	285	20	3	19	14	42	177	76	55	45
Total.....	3,470,906	37,723	10.87	4,316	2,038	1,253	76	11	51	98	234	733	338	240	296

AND THEIR CAUSES DURING 1905—Concluded.

General Diseases.					Diseases of Re- spiratory System.	Diseases of Diges- tive System.	Diseases of Genito- urinary System.	Puerperal Conditions.	Diseases of the Skin and Cellular Tissue.	Diseases of Organs of Locomotion.	Malformations.	Infantile Diseases.	Old Age.	External Violence.	Ill-defined Diseases.	Still Births.			
Pulmonary Tuberculosis.	Other Forms of Tuberculosis.	Cancer.	Rheumatism and Gout.	Other General Diseases.															
2,887 559 489	277 112 124	998 274 264	106 36 35	941 243 271	2,937 639 637	2,485 528 582	2,667 476 401	836 118 90	2,748 485 398	1,529 300 270	215 71 79	91 19 18	40 33 29	101 17 18	1,112 169 220	1,276 511 678	1,982 338 276	550 236 284	1,448 329 193
3,935	513	1,536	177	1,455	4,213	3,595	3,544	1,044	3,631	2,069	365	128	102	136	1,501	2,465	2,596	1,070	1,975

SUMMARY OF MORTALITY REPORTS.

The total number of deaths reported from all causes—excluding premature and still births—by the cities, villages and townships represented in the preceding tables was 37,723. The population of the cities, villages and townships represented (estimated) was 3,470,906, which is equal to an annual death rate of 10.87 per thousand living population represented.

The deaths in 3,230,068 living population (estimated) in 1904, were 41,338, equal to an annual death rate of 12.80 per thousand; while in 1903 the total number of deaths reported in 3,015,598 population was 38,288, equal to a mortality rate of 12.62 per thousand.

DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.

The number of deaths reported of children under five years of age (premature and still born excluded) was 6,354, which is equal to 16.8 per cent. of the deaths from all causes, and a death rate of 1.8 per thousand population represented. The death rate of children under five the preceding year was 2.8 per thousand population represented.

GENERAL DISEASES.

The total number of deaths reported from general diseases was 10,946, which is equal to 29.0 per cent. of the deaths reported from all causes, and an annual rate of 3.2 per thousand population represented.

CROUP AND DIPHTHERIA.

The total number of deaths reported from croup and diphtheria was 733, which is equal to 1.9 per cent. of the deaths reported from all causes, and a death rate of .21 per thousand of the population represented.

The number of deaths reported the preceding year from these causes was 658, equal to a mortality rate of .20 per thousand of the population represented.

MEASLES, SCARLET FEVER AND WHOOPING COUGH.

The total number of deaths reported from measles, scarlet fever and whooping cough was 383, which is equal to 1.02 per cent. of the number of deaths reported from all causes, and a mortality rate of .11 per thousand of the population represented.

The total number of deaths reported from these diseases during the preceding year was 527, equal to a mortality rate of .16 per thousand population represented.

TYPHOID FEVER.

The total number of deaths reported from typhoid fever was 1,253, which is equal to 3.3 per cent. of the total number reported from all causes, and a mortality rate of .36 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,521, equal to a mortality rate of .47 per thousand population represented.

CANCER.

The total number of deaths reported from cancer was 1,536, which is equal to 4.1 per cent. of the deaths reported from all causes, and a mortality rate of .40 per thousand population represented.

The number of deaths reported from this cause the preceding year was 1,619, equal to a mortality rate of .50 per thousand population represented.

PULMONARY TUBERCULOSIS.

The total number of deaths reported from pulmonary tuberculosis was 3,935, which is equal to 10.4 per cent. of the deaths reported from all causes, and a mortality rate of 1.1 per thousand population represented.

The total number of deaths reported from this cause the preceding year was 4,487, equal to a mortality rate of 1.4 per thousand population represented.

DISEASES OF THE NERVOUS SYSTEM.

The total number of deaths reported from diseases of the nervous system was 4,213, which is equal to 11.2 per cent. of the deaths reported from all causes, and a mortality rate of 1.2 per thousand population represented.

DISEASES OF THE CIRCULATORY SYSTEM.

The total number of deaths reported from diseases of the circulatory system was 3,595, which is equal to 9.5 per cent. of the deaths reported from all causes, and a mortality rate of 1.04 per thousand population represented.

DISEASES OF THE RESPIRATORY SYSTEM.

The total number of deaths reported from diseases of the respiratory system was 4,588, which is equal to 12.2 per cent. of the deaths reported from all causes, and a mortality rate of 1.3 per thousand population represented.

DISEASES OF THE DIGESTIVE SYSTEM.

The total number of deaths reported from diseases of the digestive system was 3,631, which is equal to 9.6 per cent. of the deaths reported from all causes, and a mortality rate of .97 per thousand population represented.

DISEASES OF GENITO-URINARY SYSTEM.

The total number of deaths reported from diseases of the genito-urinary system was 2,099, which is equal to 5.6 per cent. of the deaths from all causes, and a mortality rate of .56 per thousand population represented.

PUERPERAL CONDITIONS.

The total number of deaths reported from puerperal conditions was 365, which is equal to .97 per cent. of the deaths reported from all causes, and a mortality rate of .1 per thousand population represented.

DISEASES OF THE SKIN AND CELLULAR TISSUE.

The total number of deaths reported from diseases of the skin and cellular tissue was 128, which is equal to .34 per cent. of the deaths reported from all causes, and a mortality rate of .03 per thousand population represented.

DISEASES OF ORGANS OF LOCOMOTION.

The total number of deaths reported from diseases of the organs of locomotion was 102, which is equal to .27 per cent. of the deaths reported from all causes, and a mortality rate of .03 per thousand population represented.

MALFORMATIONS.

The total number of deaths reported from malformations was 136, which is equal to .36 per cent. of the deaths reported from all causes, and a mortality rate of .036 per thousand population represented.

INFANTILE DISEASES.

The total number of deaths reported from infantile diseases was 1,501, which is equal to 4 per cent. of the deaths reported from all causes, and a mortality rate of .4 per thousand population represented.

OLD AGE.

The total number of deaths reported from old age was 2,465, which is equal to 6.5 per cent. of the deaths reported from all causes, and an annual rate of .65 per thousand population represented.

VIOLENCE.

The total number of deaths from violence was 2,596, which is equal to 6.9 per cent. of the deaths reported from all causes, and a mortality rate of .69 per thousand population represented.

During the preceding year there were 2,534 deaths reported from violence, equal to a mortality rate of .78 per thousand population represented.

ILL-DEFINED DISEASES.

The total number of deaths reported from ill-defined diseases was 1,070, which is equal to 2.8 per cent. of the deaths reported from all causes, and a mortality rate of .28 per thousand population represented.

PREMATURE AND STILL BIRTHS.

The total number of premature and still births reported was 1,975, which is equal to 5.2 per cent. of the deaths reported from all causes, and a rate of .53 per thousand population represented.

During the preceding year there were 2,781 premature and still births reported, equal to a rate of .86 per thousand population represented.

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